

DEPARTMENT OF NATURAL RESOURCES

COPPER

IN CALIFORNIA

BULLETIN 144

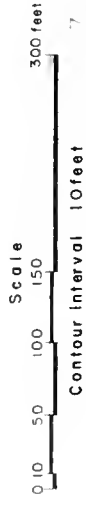
1948

DIVISION OF MINES
FERRY BUILDING, SAN FRANCISCO

MAP SHOWING RELATIONSHIP OF THE FOOTHILL COPPER-ZINC BELT
OF CALIFORNIA TO THE BATHOLITH OF THE SIERRA NEVADA

JUNE 1945

JUNE 1945



Contour Interval 10 feet

EXPLANATION

Greenstone and chlorite schist

Metafelsite

Metafelsite

Sericitized pyritized schist

Sericitized pyritized schist

Gossan bo, barite

Gossan bo, barite

Attitude of schistosomiasis

Attitude of schistosomiasis

Vertical schistosity

Vertical schistosity

Fault, showing dip

Fault, showing dip

Vertical fault

Vertical fault

Quartz vein, showing dip

Quartz vein, showing dip

Contact, showing dip

Contact, showing dip

Q. DAH Hoefling Brothers diamond-drill

Hoefling Brothers diamond-d

SP Hoefling Brothers spontaneous polarization

Hoefling Brothers spontaneous

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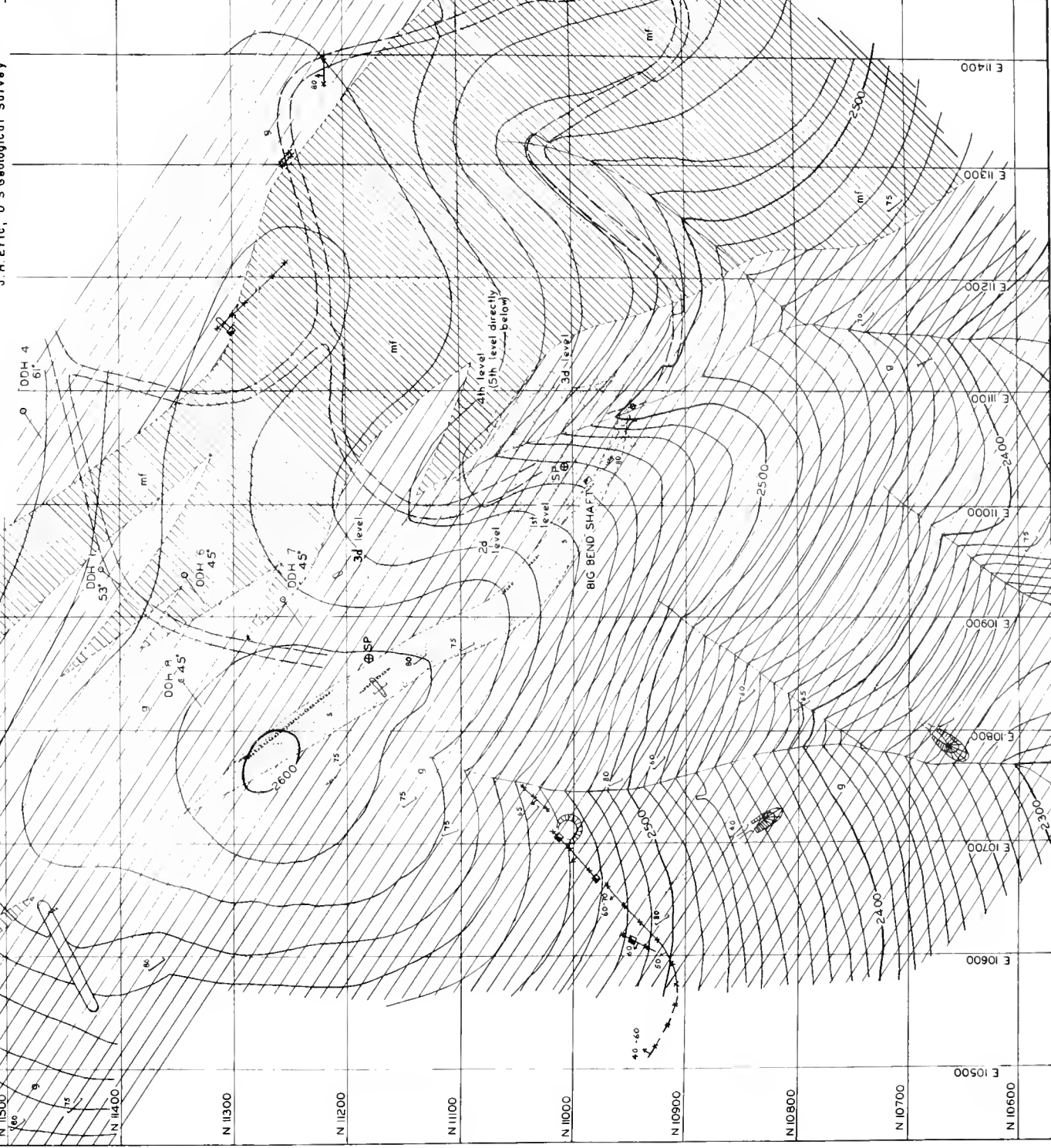
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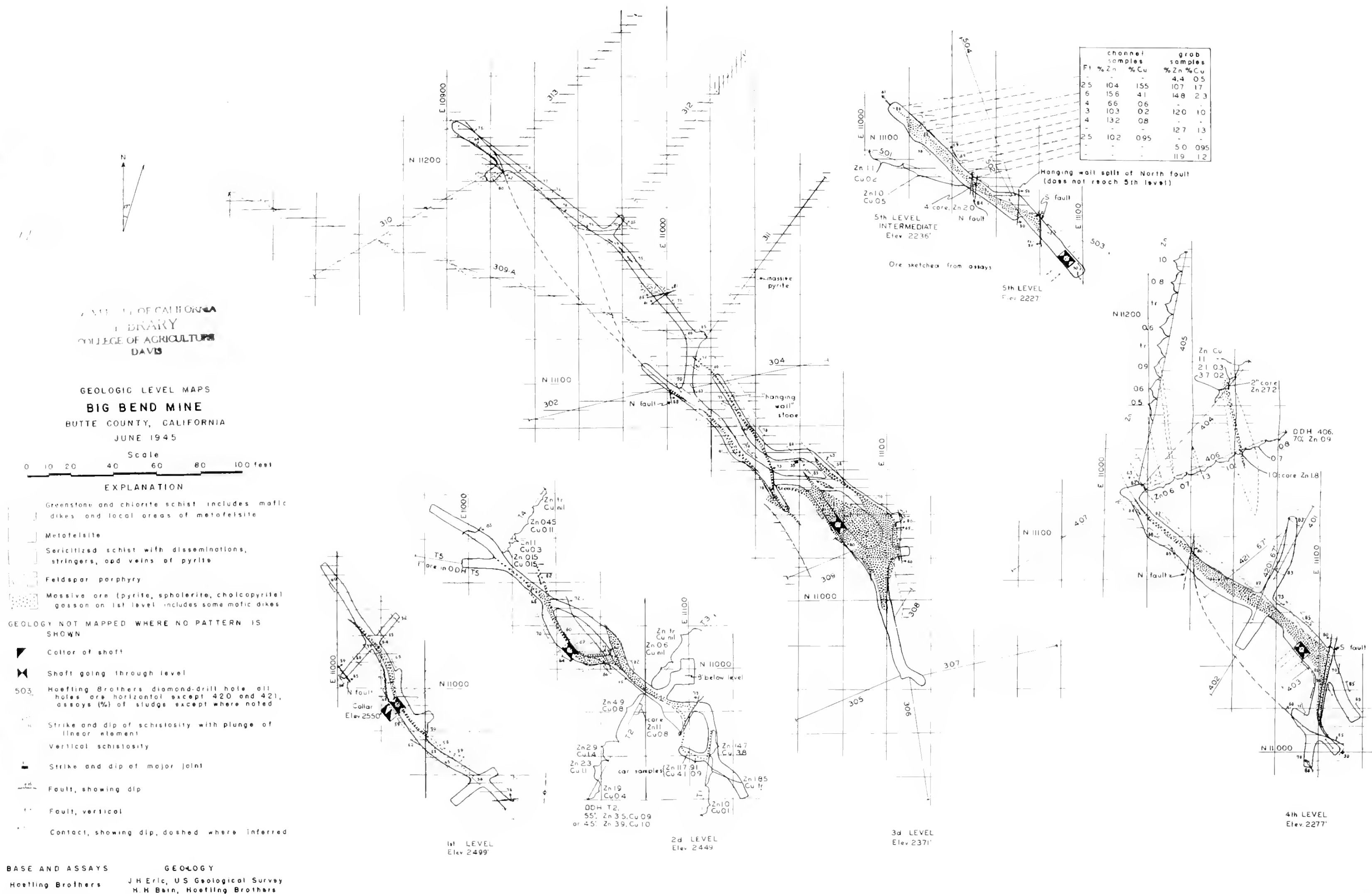
HOEGLING BROTHERS
107 OAKLAND

F. H. Frøderick,
Brothers

F. H. Frederick, H. H. Bein; Hoefling

Brothers
F. H. Frederick,
Musicians

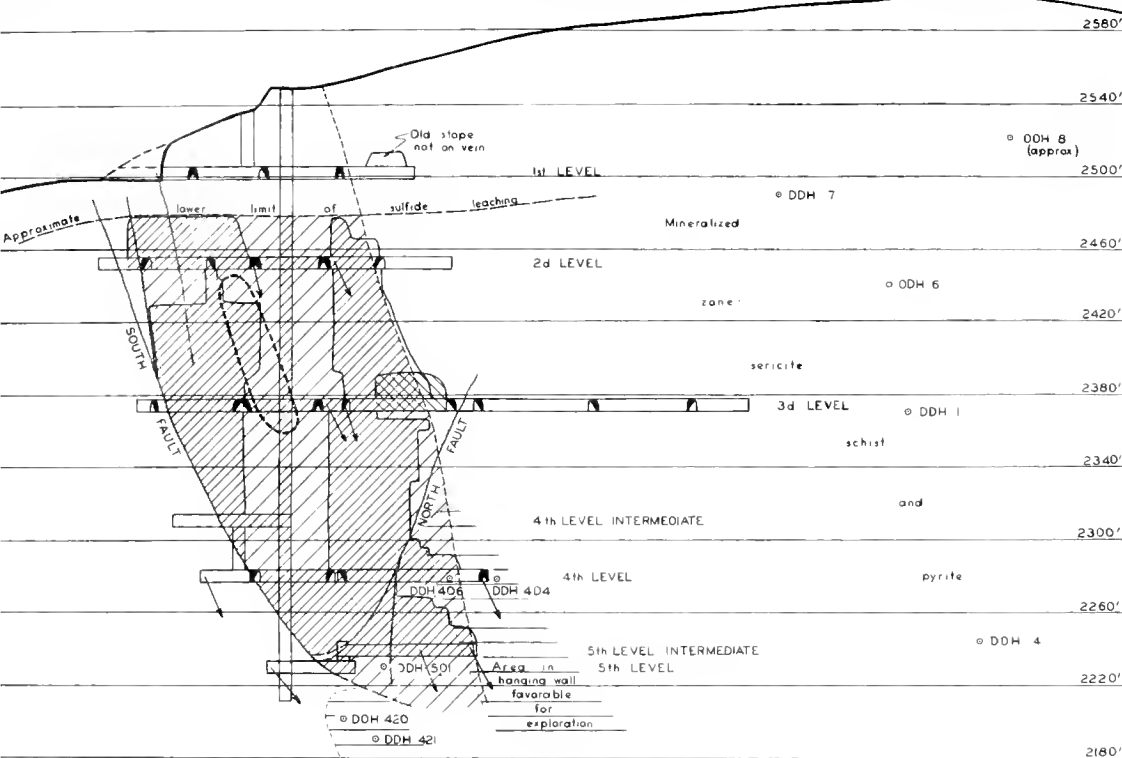




540E

N 40W S 50W

N 50E



Projection based largely on data
furnished by Hoefling Brothers

0 10 20 40 100 FEET

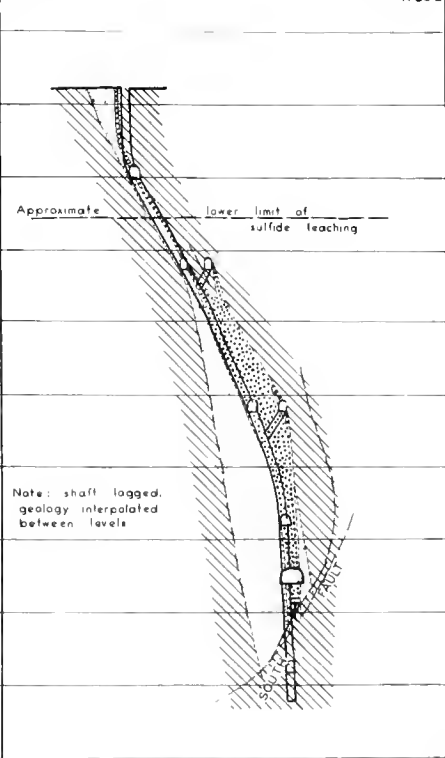
EXPLANATION

- Crosscut toward observer
- ▨ Ore mined
- ▨ Ore in place
- ▨ 3d level "hanging-wall" stope
- Approximate north boundary of ore body
- - - Approximate limits within which ore is more than 20 feet wide
- - - Approximate upper south boundary of hypothetical ore body below South fault
- Approximate outline of hypothetical hanging-wall ore body
- Intersection of principal fault with mineralized zone
- DDH 4 Intersection of diamond drill hole with mineralized zone
- DDH 7 Crosscut away from observer
- Plunge of linear element

VERTICAL LONGITUDINAL PROJECTION AND SECTION ALONG SHAFT

BIG BEND MINE

BUTTE COUNTY, CALIFORNIA



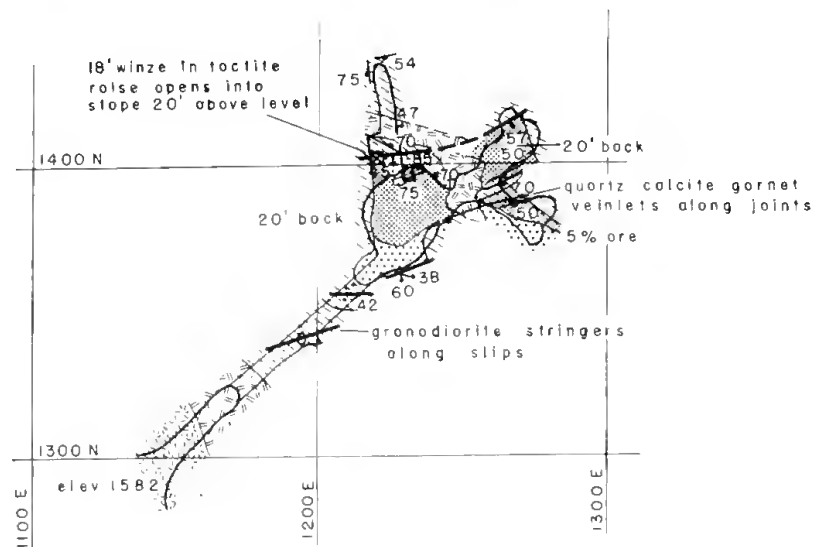
Note: shaft logged,
geology interpolated
between levels

EXPLANATION

- ▨ Massive ore; gossan
- ▨ Sericitized and pyritized schist
- ▨ Greenstone and chlorite schist
- Principal fault
- - - Contact
- Drift

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UPPER TUNNEL

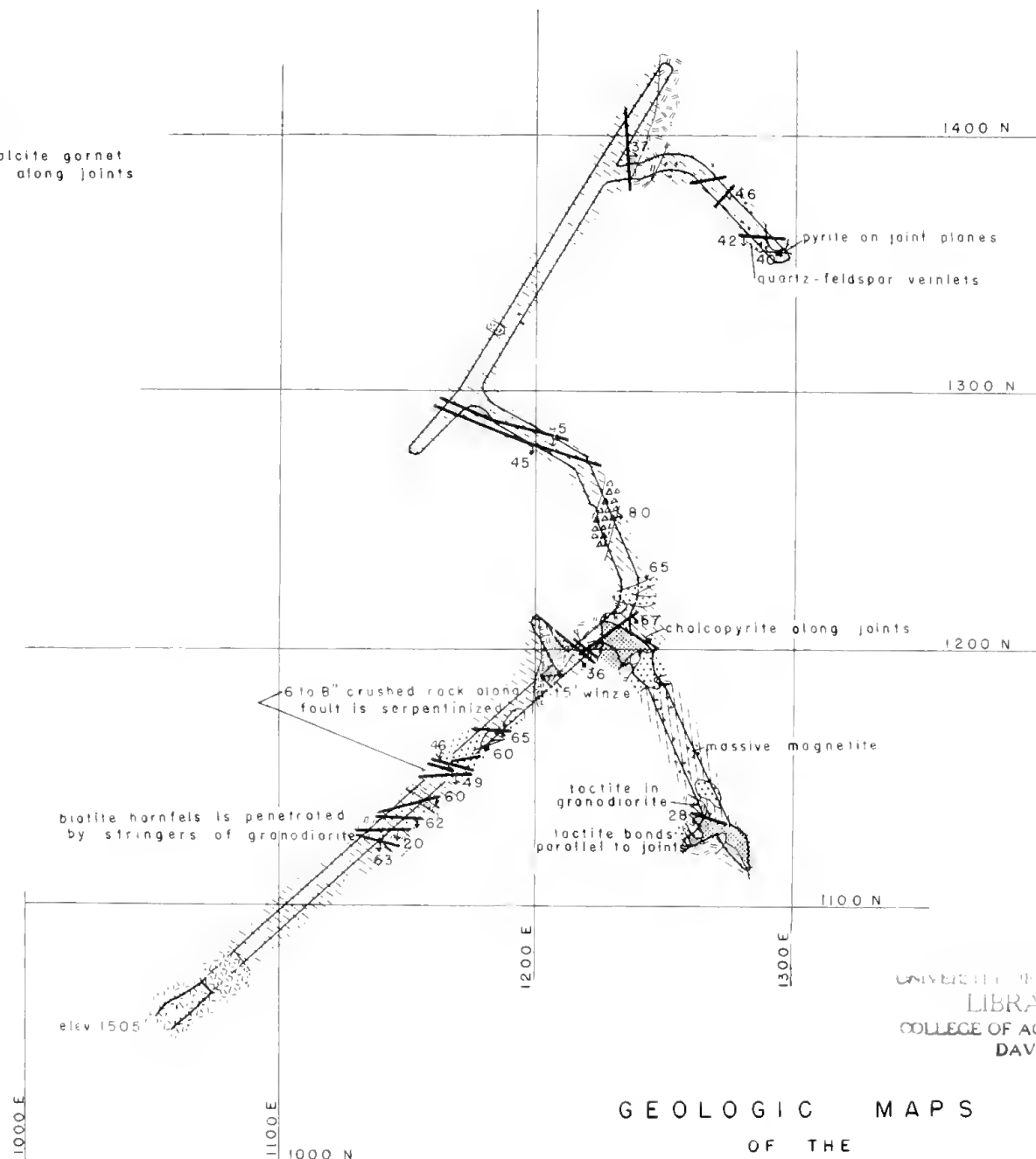


EXPLANATION FOR TUNNEL MAPS

- Ore: streaks of chalcopryite and pyrite
- Quartz-calcite-magnetite rock: contains a small quantity of sulphides
- Tactite: coarse grained to dense rock composed of quartz, epidote, garnet, and magnetite
- Hornfels-tactite, undifferentiated: crosses indicate spots of tactite
- Hornfels: green to black siliceous rock locally with biotite metacrysts
- Hornblende granodiorite
- Contact phase of granodiorite: fine to medium grained green rock
- Hornblende diorite
- Syenite porphyry

- Contact showing dip
- Fault showing dip, and plunge of slickensides
- Vertical fault
- Strike and dip of joint

LOWER TUNNEL



GEOLOGIC MAPS

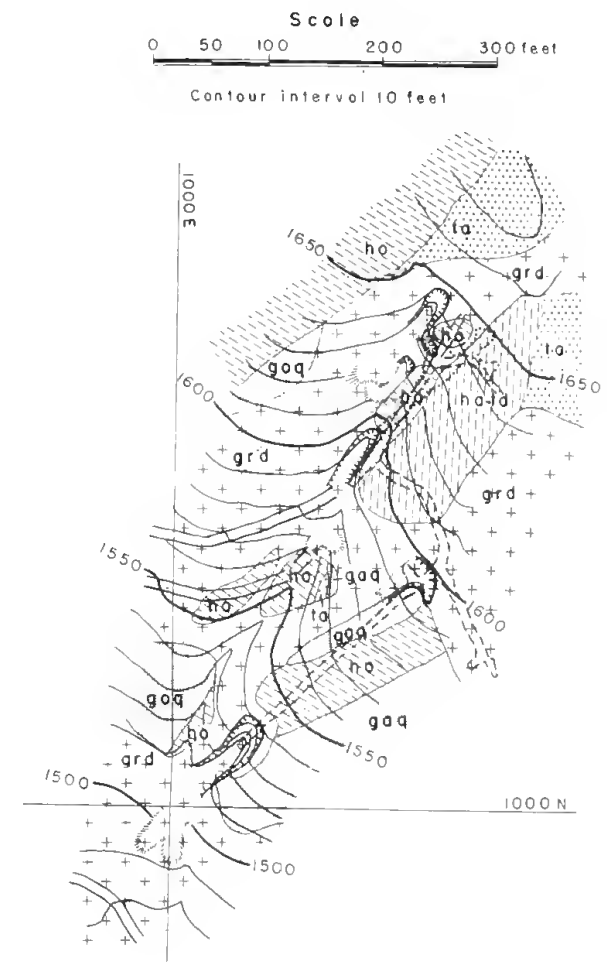
OF THE

LILYAMA MINE ELDORADO COUNTY

BY
D.G. WYANT, M.W. COX, AND G.R. HEYL

MARCH 1944

SURFACE MAP



EXPLANATION FOR SURFACE MAP

- Tactite: garnet, epidote, diopside? idocrase? magnetite rock with patches of sulphides or gosson
- Hornfels-tactite, undifferentiated: spots of tactite and gosson in hornfels
- Hornfels
- Garnet-quartzite
- Granodiorite: includes several phases distinguished underground

- Contact
- Open cut
- Dump
- Underground working, upper tunnel
- Underground working, lower tunnel

GEOLOGIC MAP OF THE PIONEER MINE AREA ELDORADO COUNTY, CALIFORNIA

GEOLOGY BY
M.W. COX AND D.G. WYANT
MARCH 1944

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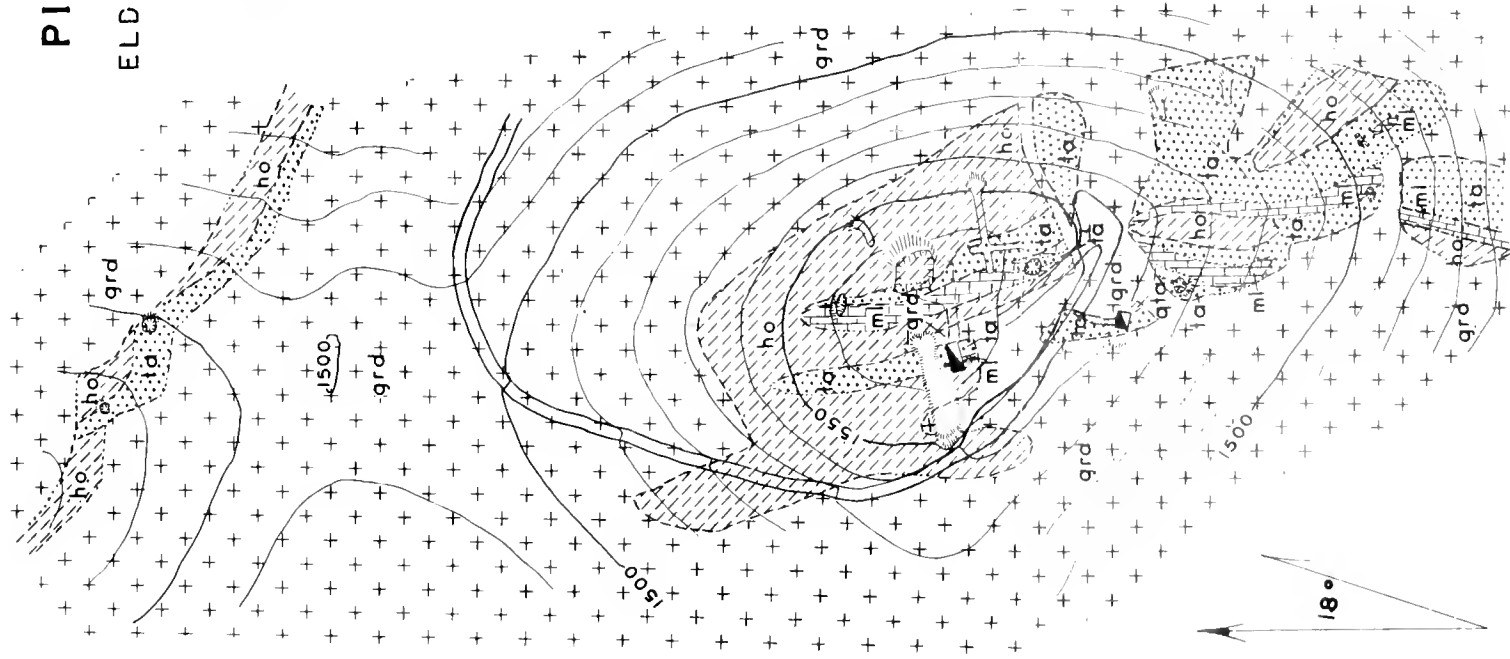
Scale

0 100 200 300 feet

Contour interval 10 feet

EXPLANATION

	Garnet-talcite		Contact
	Quartz-talcite		Pit
	Hornfels		Open hole
	Marble		Shaft
	Granodiorite		





GEOLOGY BY
GR HEYL AND J HERIC

Base from aerial photographs supplied by Wayne Lael
Control by J H Eric

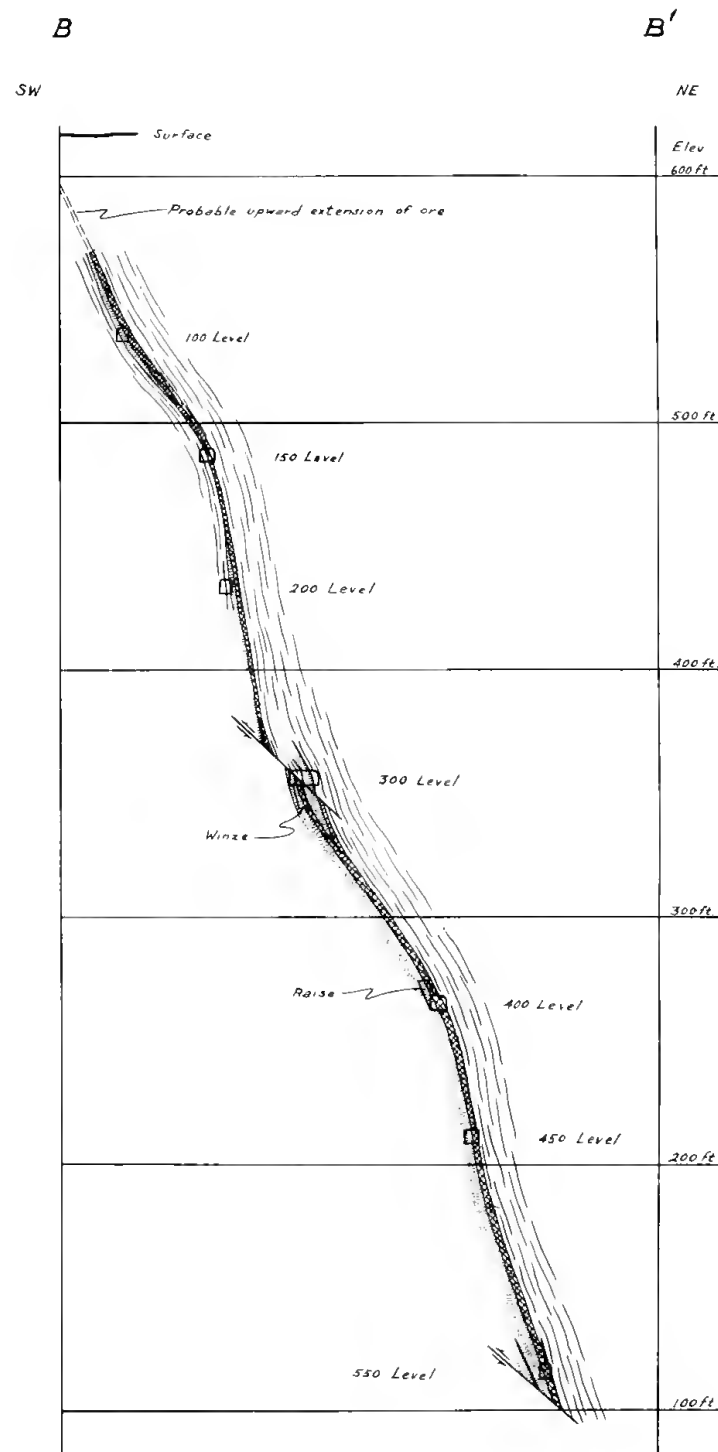
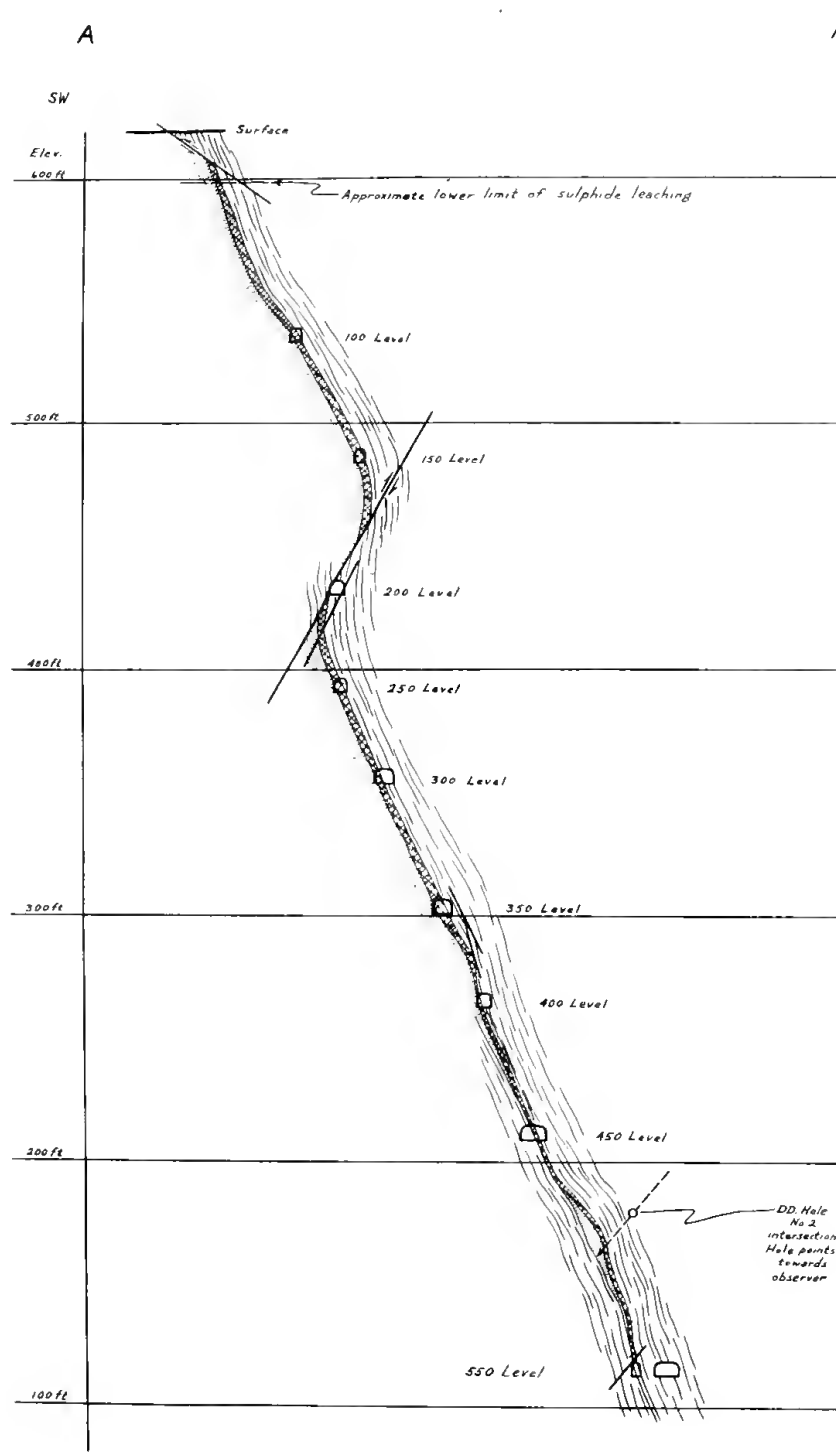
SEPTEMBER 1948

SCALE

SCALE

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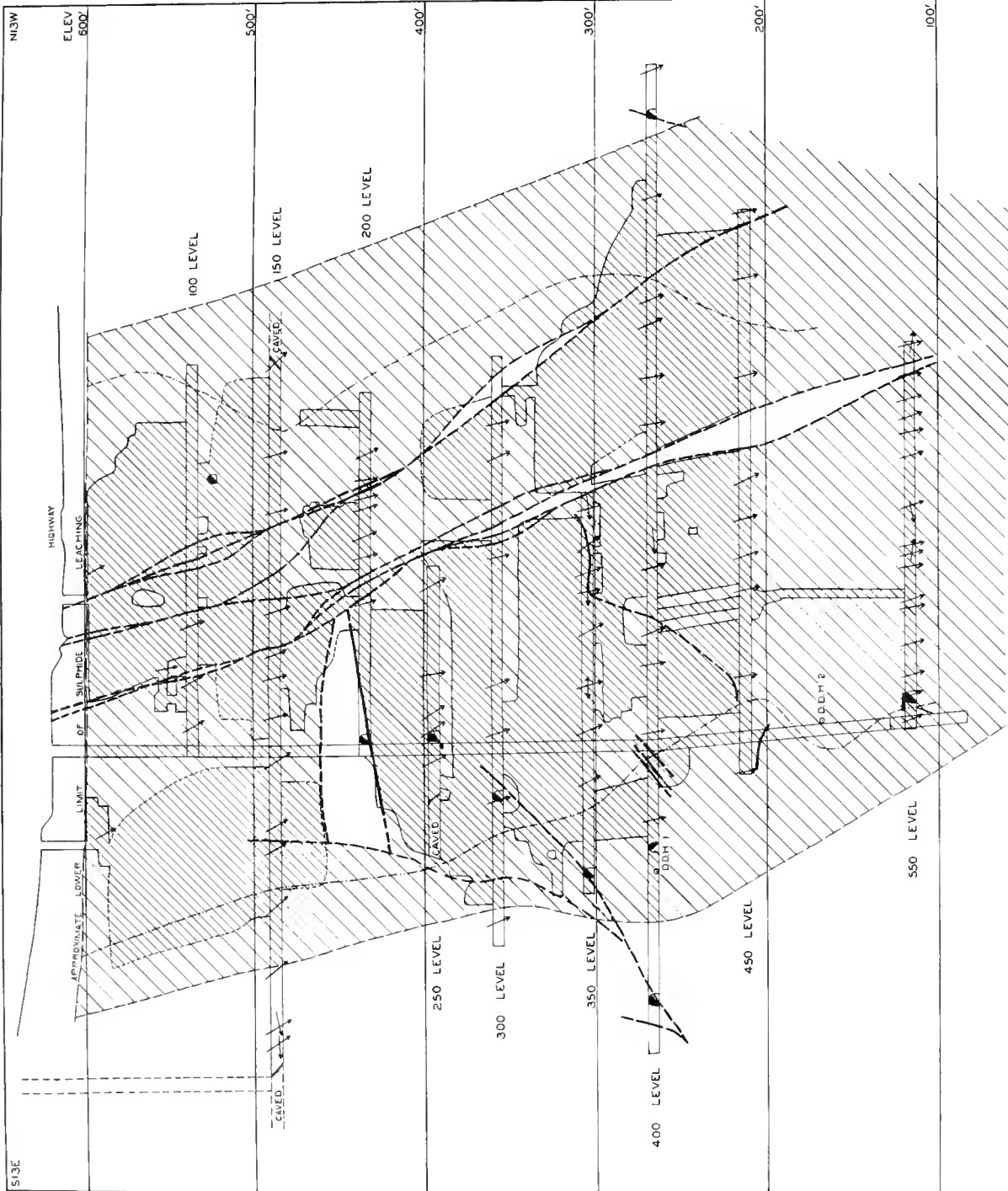
GEOLOGIC SECTIONS
NEWTON MINE
AMADOR COUNTY, CALIFORNIA
BY GR HEYL
1945

Scale
0 20 40 80 120 160 feet

EXPLANATION

- Copper ore; massive pyrite and chalcopyrite, with some chalcocite in upper levels.
- Strongly pyritized schist, generally with some sericite and/or quartz; includes bands of massive pyrite.
- Green schist, the main constituents being chlorite, amphibole, epidote, and/or quartz.
- Geologic contact
- Fault, arrows indicate relative movement
- Mine workings
- Slope boundary

Elevation datum approximate sea level



VERTICAL LONGITUDINAL PROJECTION

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 DAVIS

AMADOR COUNTY CALIFORNIA
 BY GR HEYL
 EXPLANATION

- Ore in place
- Ore mined
- Crosscut toward observer
- Crosscut away from observer
- Intersection of fault with hanging wall of ore zone
- Approximate limit of ore body
- Approximate limit of pyritized footwall
- Plunge of lineation
- Intersection of Bureau of Mines diamond drill hole with ore zone

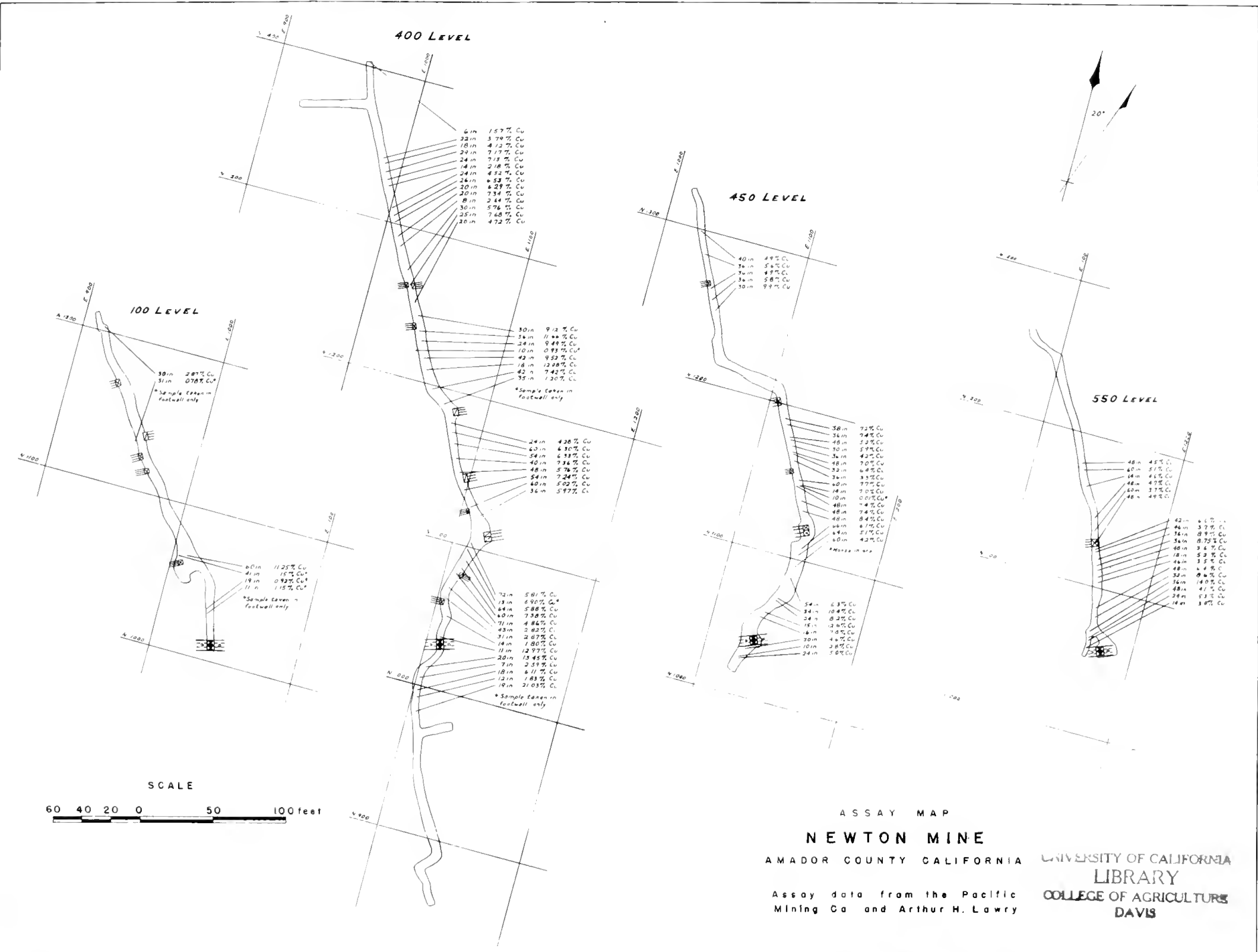


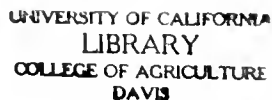
Elevation datum approximate sea level

Outline of slopes in part by Winston Copper Company and Pacific Mining Company

JHE

OCTOBER 1945





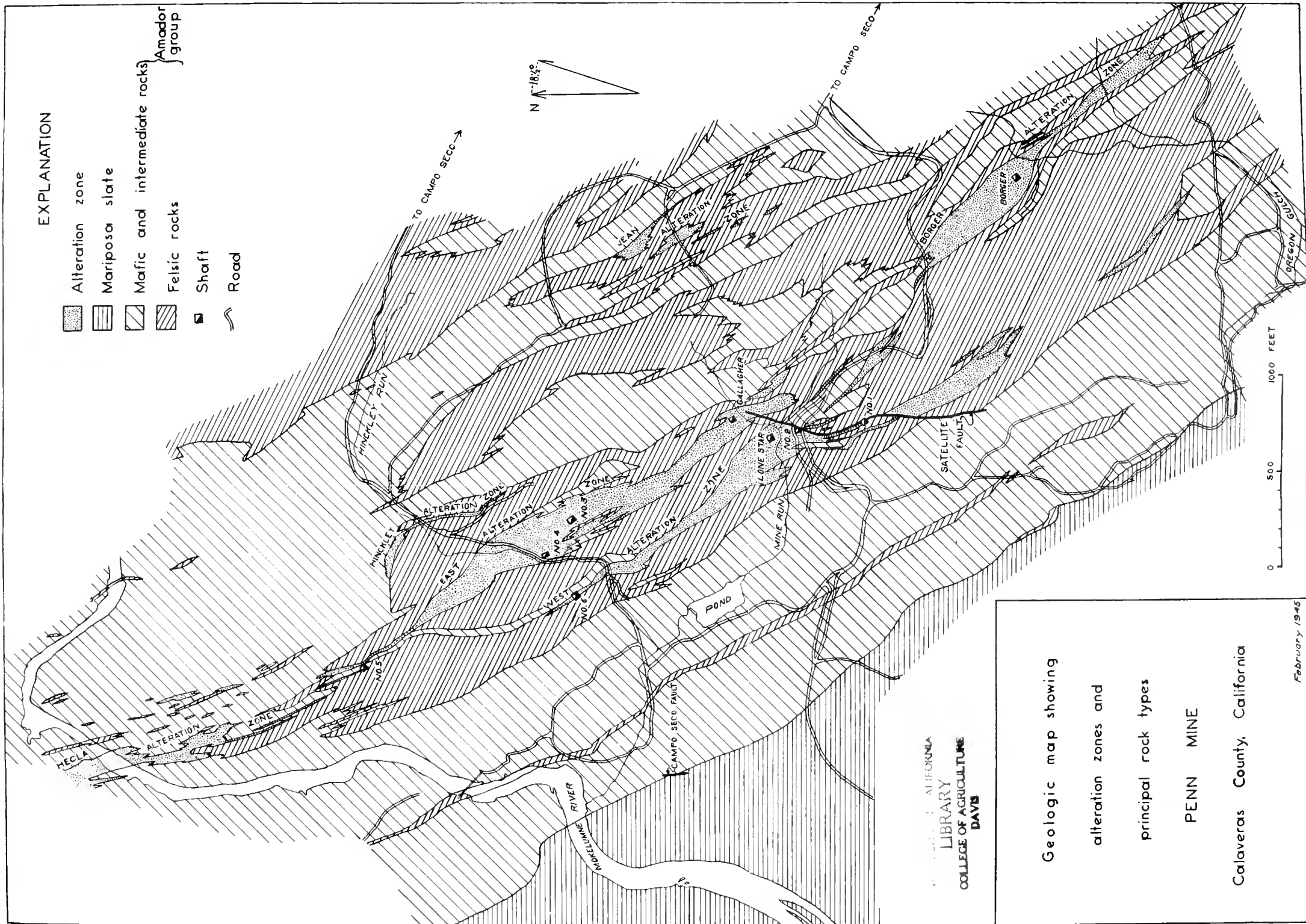


MAP OF
LEVELS, SHAFTS AND RAISES
PENN MINE
CALAVERAS COUNTY, CALIFORNIA
Compiled from maps of Penn Mining Co. by
J.H. ERIC
JANUARY 1945

0 100 500 1000 1500 2000 2500 3000 3500 4000 4500 5000
Elevation above Sea Level

EXPLANATION
Inclined shaft or raise
Color of shaft
A Vertical section or projection

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Geologic map showing

alteration zones and

principal rock types

PENN MINE

Calaveras County, California

February 1945



EXPLANATION

SEDIMENTARY AND VOLCANIC ROCKS

QUATERNARY

Qa

Gravel, sand and alluvium

TERRESTRIAL

Ts

Gravel and coarse sand

UNCONSOLIDATED

Uc

Not a typical unit in the right of way

Metamorphic

Mt

Metamorphic rocks

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INTRUSIVE ROCKS

Gr

Granite

Qz

Quartz veins

Hr

Hornblende gneiss

Rc

Recrystallized rock

Cr

Crystalline rock

Sr

Sericitized rock

Sr

Sericitized rock

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Sericitized rock

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Sericitized rock

Small pit

Large pit or trench

Crack hole

Well

Building

Bridge

Footbridge

Aqueduct

Road

Tramroad

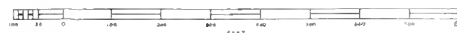
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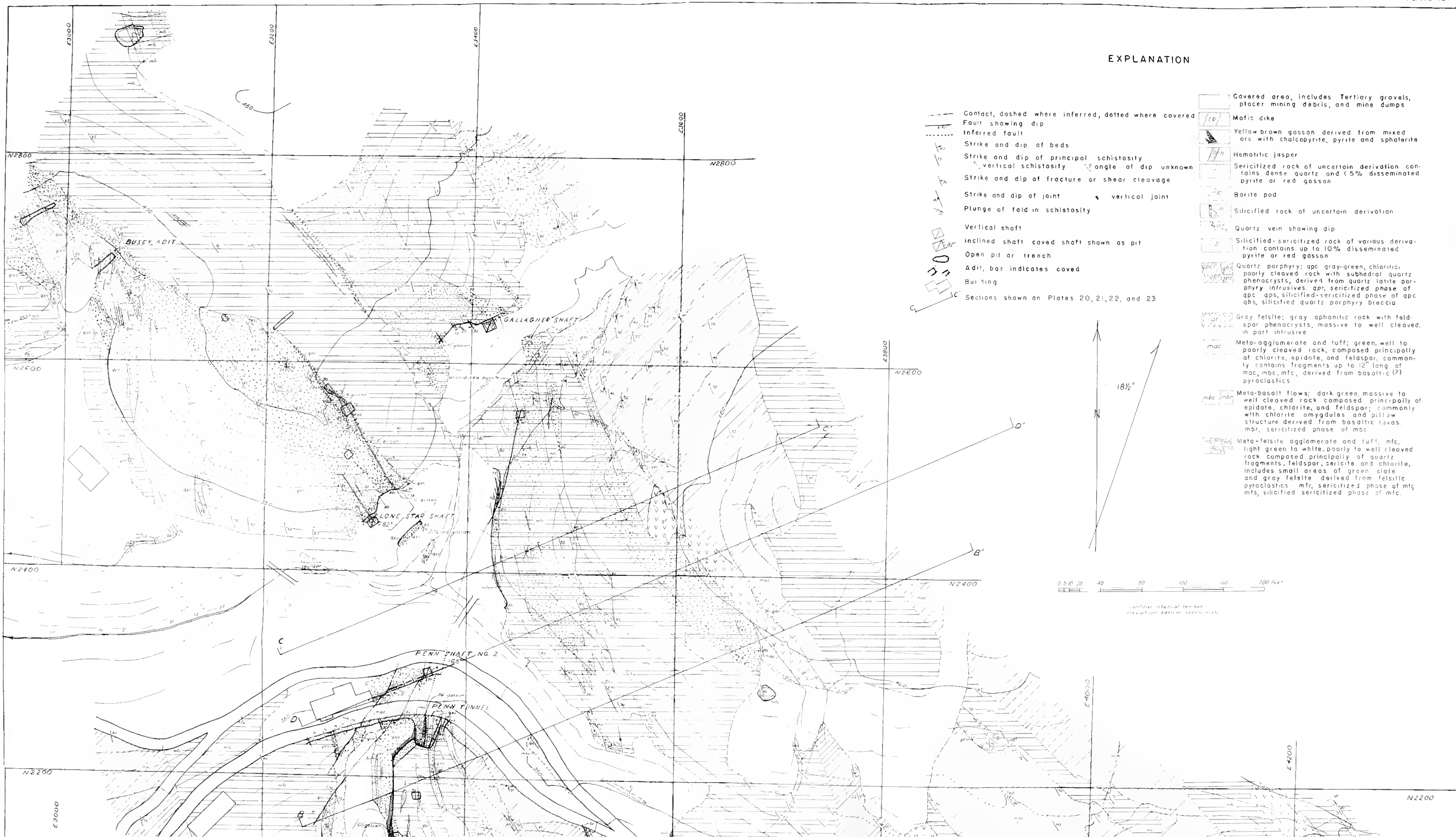
Triangulation point

Line of geologic section

Tunnel

SCALE

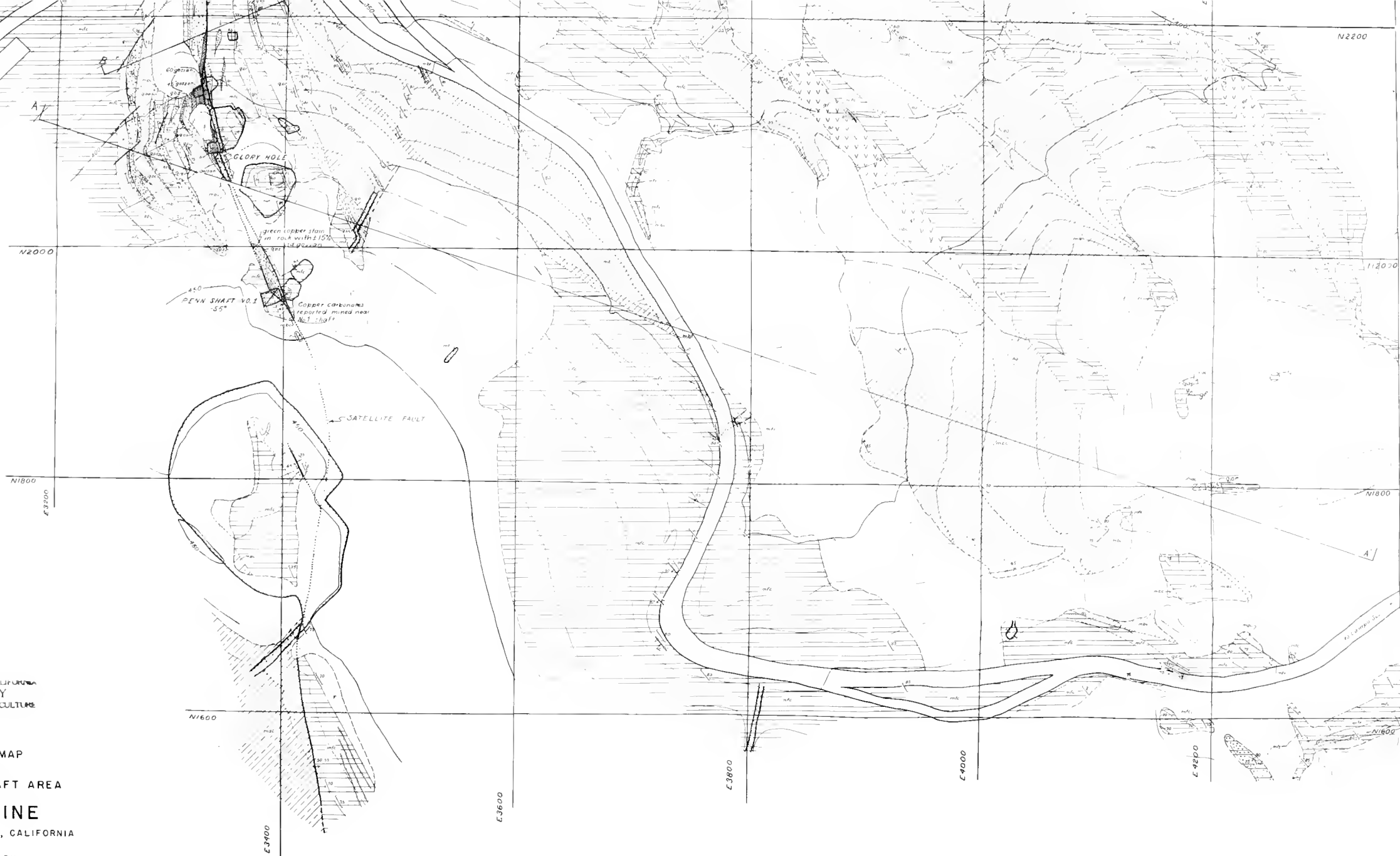


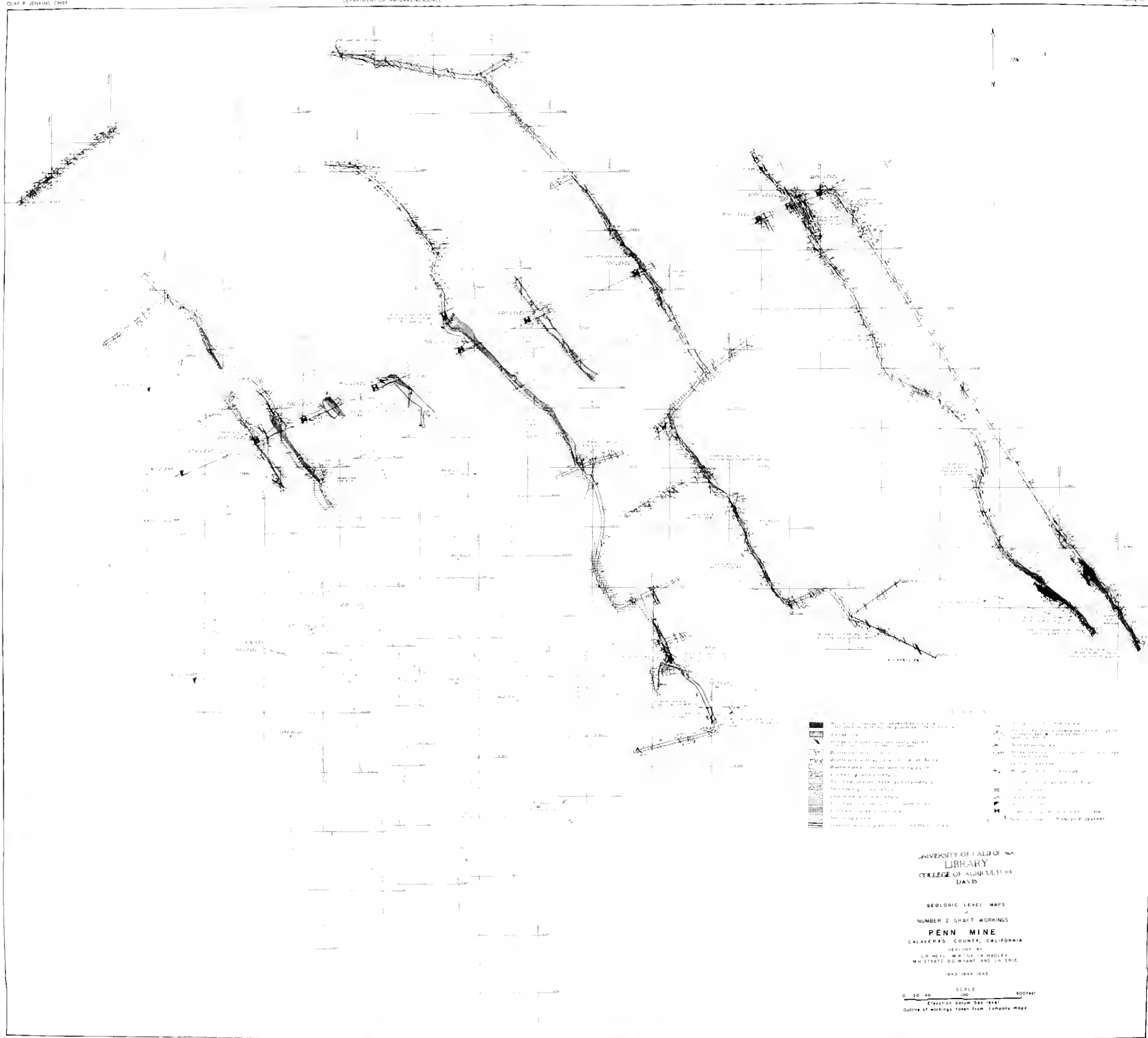


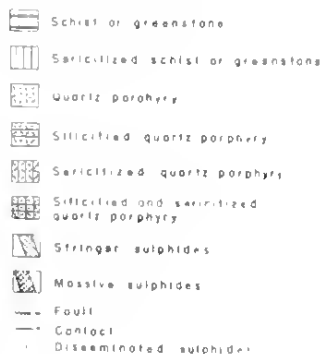
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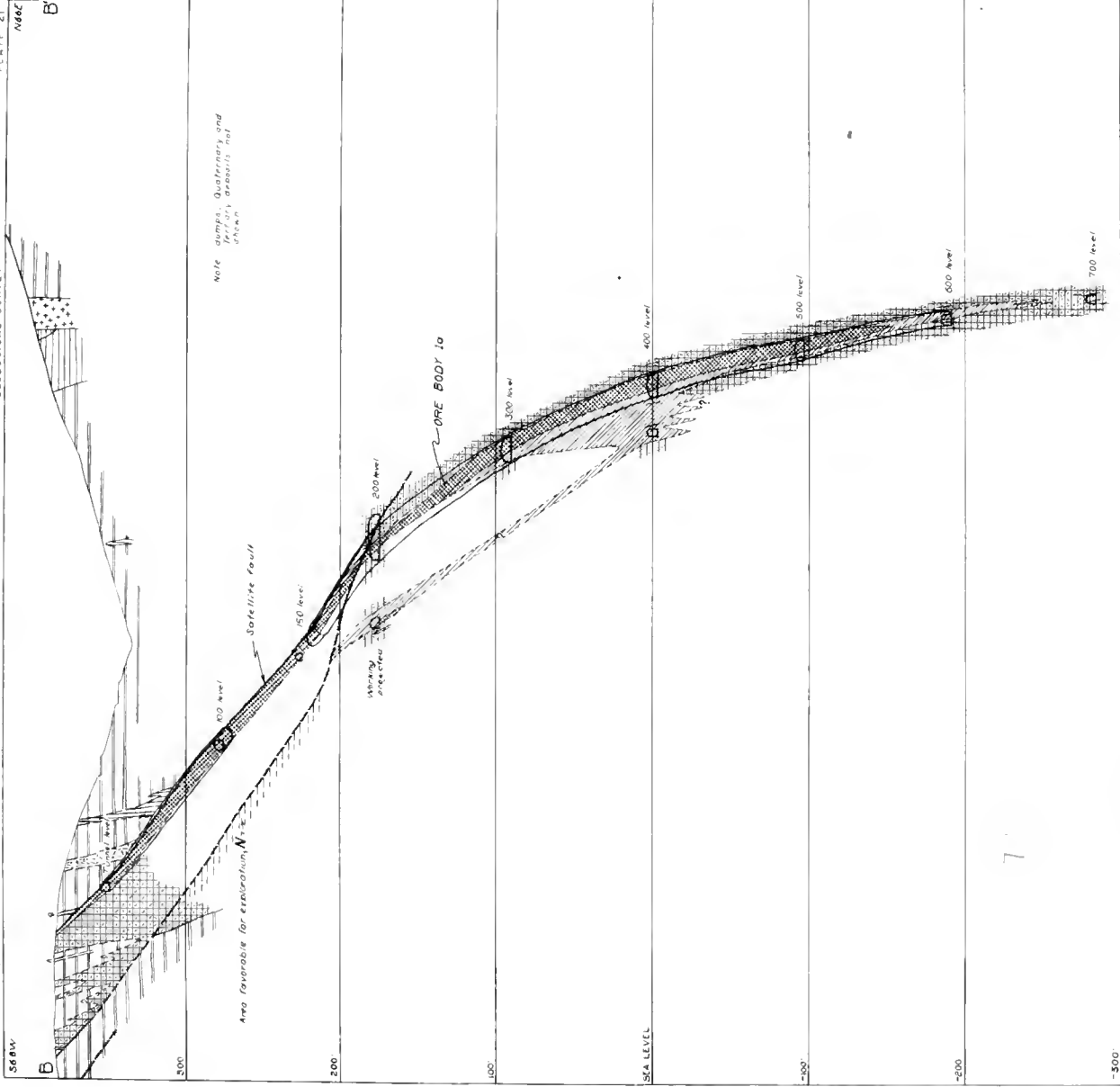
GEOLOGIC MAP
OF THE
NUMBER 2 SHAFT AREA
PENN MINE
CALAVERAS COUNTY, CALIFORNIA

SURVEYED BY
M W COX AND J H ERIC
JULY-AUGUST 1944









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VERTICAL SECTION B-B'
NO. 2 SHAFT AREA

PENN MINE
CALAVERAS COUNTY, CALIFORNIA

GEOLOGY BY
G. R. HEYL, ET AL
SCALE

0 20 40 100 200 Feet
Datum mean Sea level

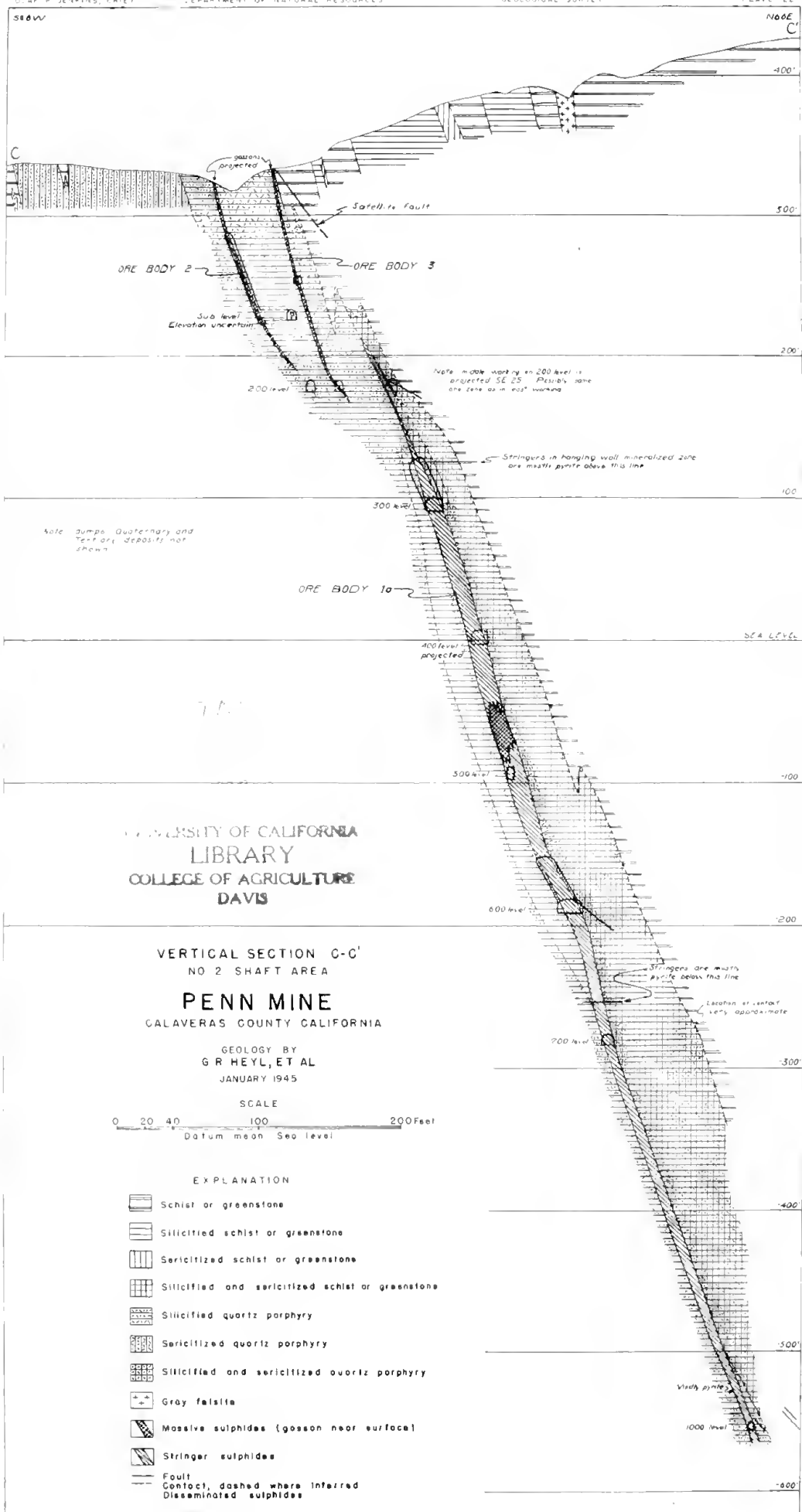
EXPLANATION

- Schist or greenstone
- Silicified schist or greenstone
- Sericitized schist or greenstone
- Silicified and sericitized schist or greenstone
- Quartz porphyry
- Silicified quartz porphyry
- Silicified and sericitized quartz porphyry
- Gray felsite

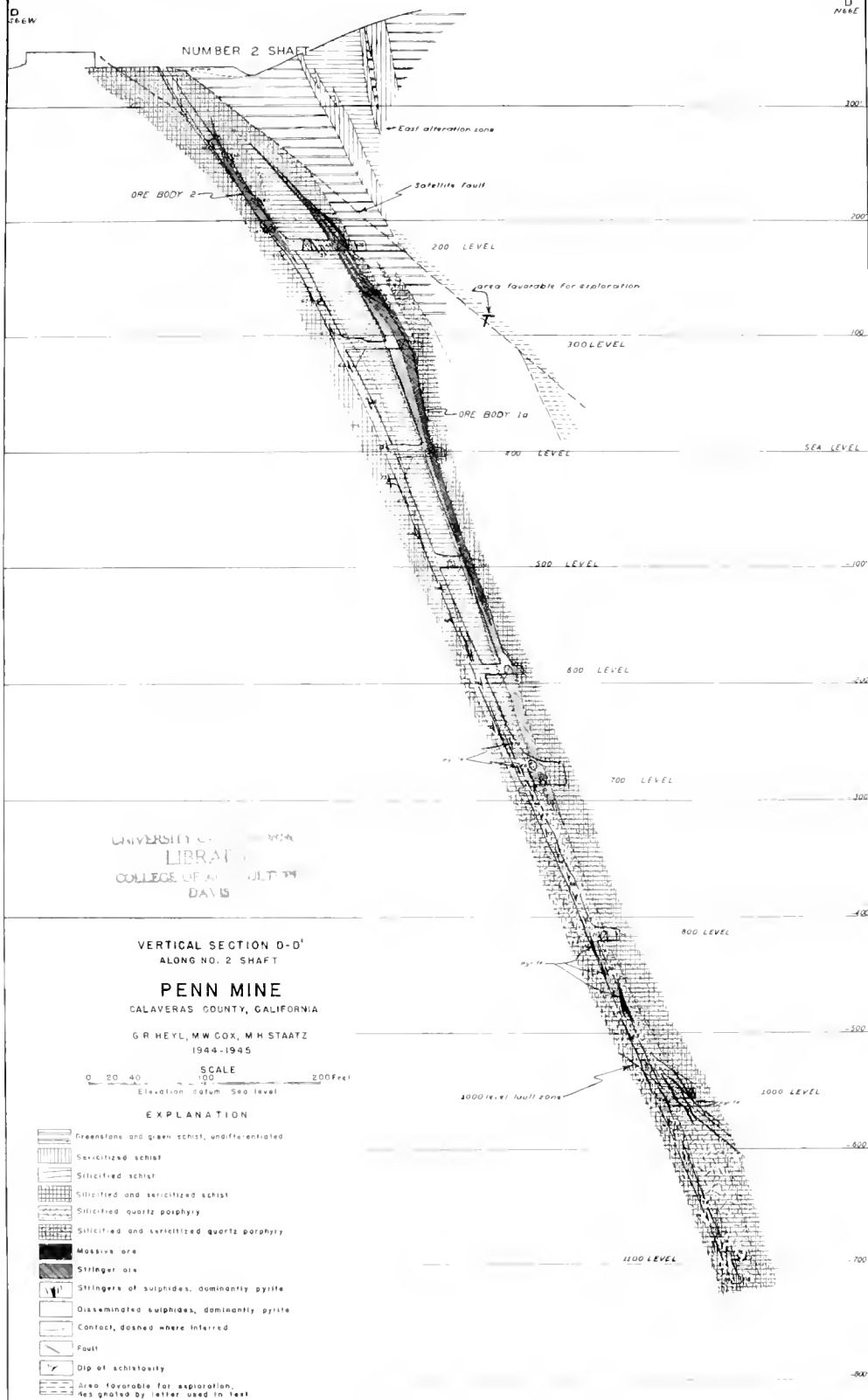
- Massive sulphides (gossan near surface)
- Stringer sulphides
- Area favorable for exploration, designated by letter used in text
- Fault
- Contact, dashed when inferred
- Dip of schistosity
- Disseminated sulphides
- Hematitic Jasper
- Quartz vein

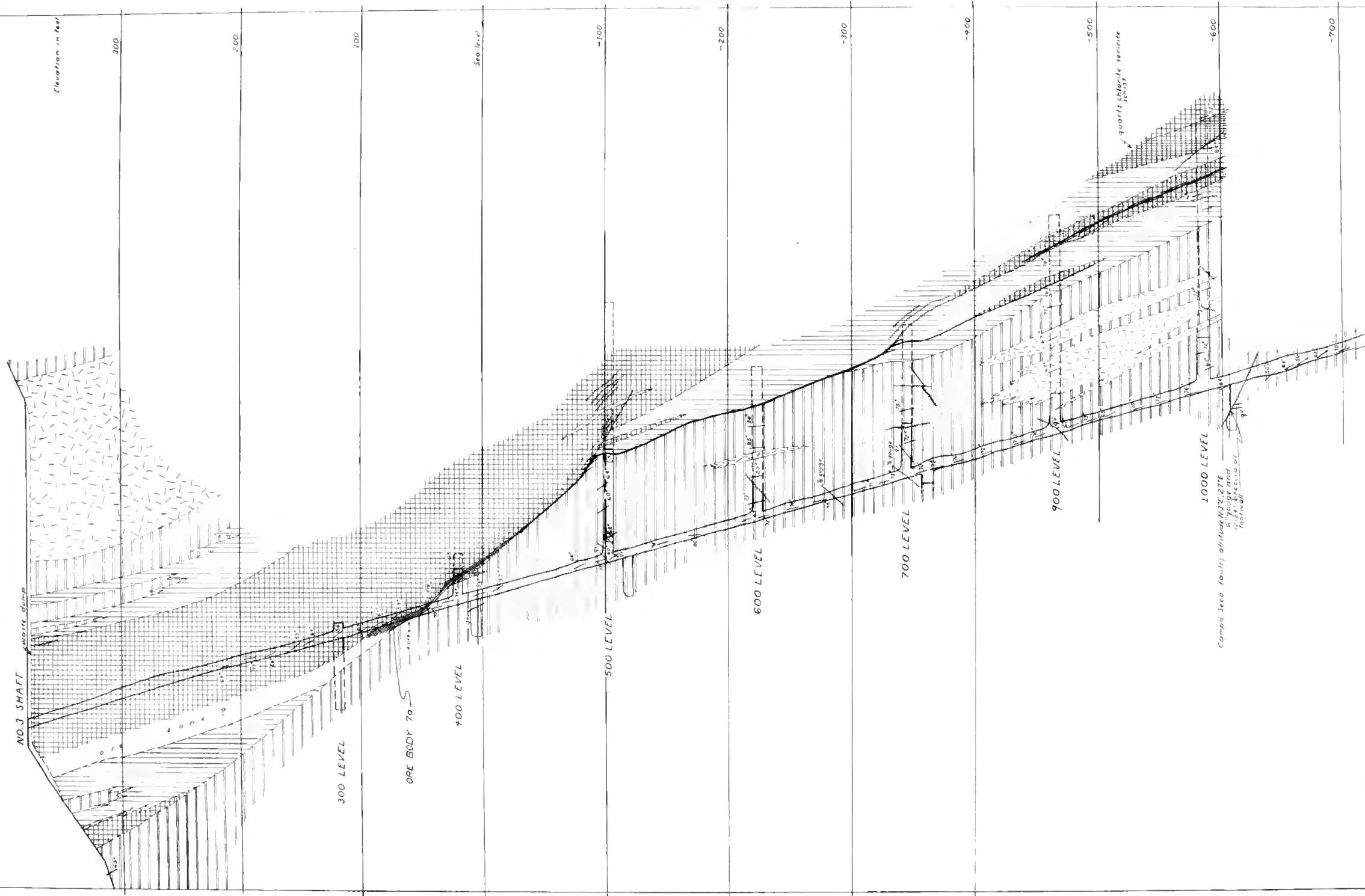
5864V

1666
C'



D'
N66E





- EXPLANATION
- Massive ore
 - Stringers of sulphides, dominantly pyrite
 - Disseminated sulphides, dominantly pyrite
 - Sericitized schist
 - Silicified and sericitized schist
 - Greenstone and green schist undifferentiated
 - Quartz porphyry
 - Contact dashed where inferred
 - Fault or fault zone
 - Dip of schistosity
 - Quartz vein

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VERTICAL SECTION E-E'
ALONG NO. 3 SHAFT

PENN MINE
CALAVERAS COUNTY CALIFORNIA

GEOLOGY BY
GR HEYL, D G WYANT, M W COX
1944-1945

SCALE
0 20 40 100 200 Feet
Elevation datum Sea level



EXPLANATION

SEDIMENTARY AND VOLCANIC ROCKS

- QUATERNARY
Qol Alluvium
Q1 Terrace gravel, sand, and volcanic ash

TERTIARY

- Tg Gravel, sandstone, mudstone, and limonite rock
Unconformity
JURASSIC
Jo Amador group low grade metamorphosed volcanics
Qc Quartz crystal tuff
Job Metabasalt, including pillow lava

INTRUSIVE ROCKS

- f Feltsite
qpz Quartz porphyry breccia
qp Quartz porphyry

ALTERED ROCKS

- st Silicified rock
s-si Sericitized silicified rock
ser Sericitized rock

MISCELLANEOUS ROCKS

- go Gossan
qv Quartz veins

- Contact observed inferred concealed
Fault showing dip observed inferred
Altitude of bed
Attitude of schistosity
Dip of quartz vein
Shalt
Adit
Pi and dump
Trench
Building
Triangulation point

GEOLOGIC MAP
OF THE

GRAYHOUSE AREA
AMADOR COUNTY, CALIFORNIA

GEOLOGY BY

G R HEYL AND M H STAATZ

TOPOGRAPHY BY

M W COX, D G WYANT AND M H STAATZ

TRIANGULATION BY

M H STAATZ AND M W COX

1943-1945

SCALE

0 100 200 400 800 Feet

Contour interval 10 feet

Elevation datum Sea level

Coordinates refer to Penn mine area tri-

angulation system

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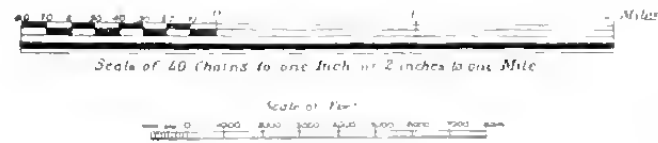
MAP
OF THE
COPPER MINES
OF
CALAVERAS COUNTY

FROM ACTUAL SURVEY AND MEASUREMENT.

Surveyed and drawn by
HANDY WALLACE
CIVIL ENGINEERS.

Published by **A. GENSOUL**, 311 Montgomery St.,
SAN FRANCISCO, JAN. 1st 1864.

B. F. Butler's Lith. San Francisco



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GEOLOGIC MAP
OF THE
COPPEROPOLIS DISTRICT
COPPEROPOLIS, CALAVERAS COUNTY, CALIFORNIA

BY
G. R. HEYL AND J. B. HADLEY

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DARYN

SCALE

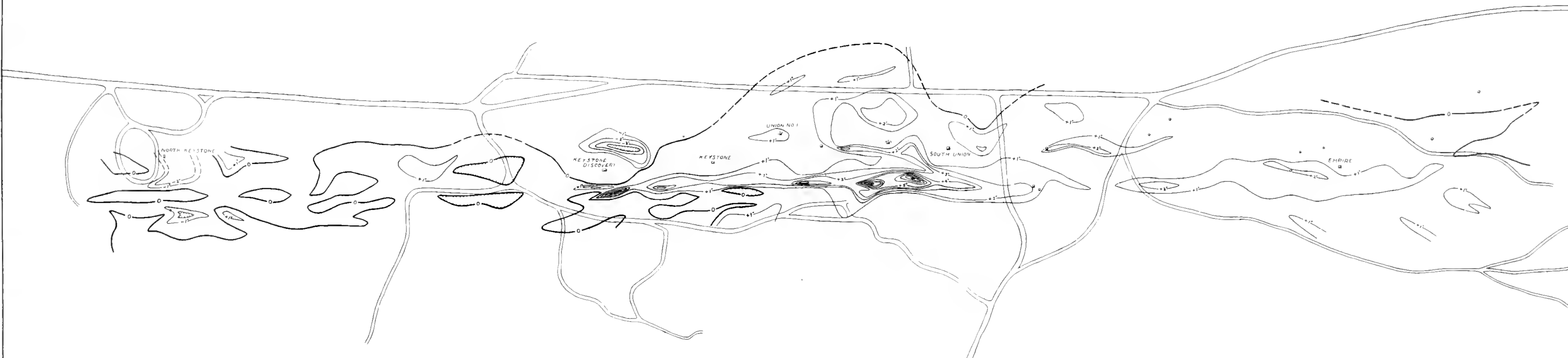
0 200 600 1000 Feet

EXPLANATION






- | | | | |
|--|--|--|--|
| | Gossan | | Contact, dashed where approximately located |
| | Quartz vein | | Fault showing dip dashed where approximately located |
| | Chloritized rock | | Trace of individual bed |
| | Granodiorite | | Strike and dip of beds |
| | Diorite and quartz diorite | | Vertical beds |
| | Hornblende | | Strike and dip of cleavage or schistosity |
| | Hornblende breccia | | Vertical cleavage or schistosity |
| | Sausseritized gabbro | | Caved shaft |
| | Serpentine | | Pit or trench |
| | Talc schist | | Shaft |
| | Small dikes, type indicated by letter symbol | | Dump |
| | Argillaceous slate | | |
| | Schist and greenstone of volcanic origin, with slaty tuff intercalations | | |
| | Bedded hornstone, tuff, and volcanic breccia | | |

NW END OF AREA

SE END OF AREA



EXPLANATION

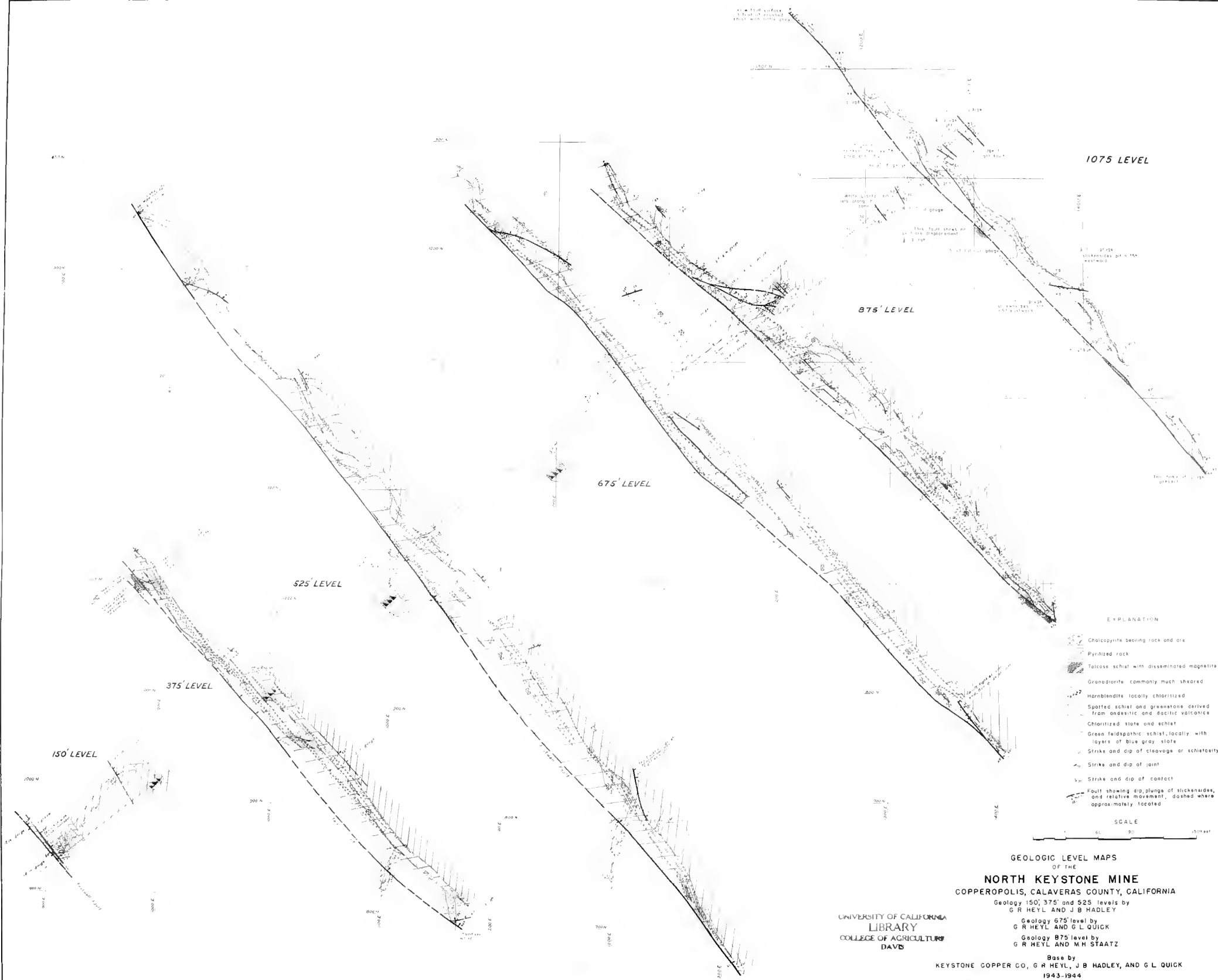
-  Contour of normal magnetic dip
-  Contour of anomalous magnetic dip
-  Shaft
-  Caved shaft
-  Road

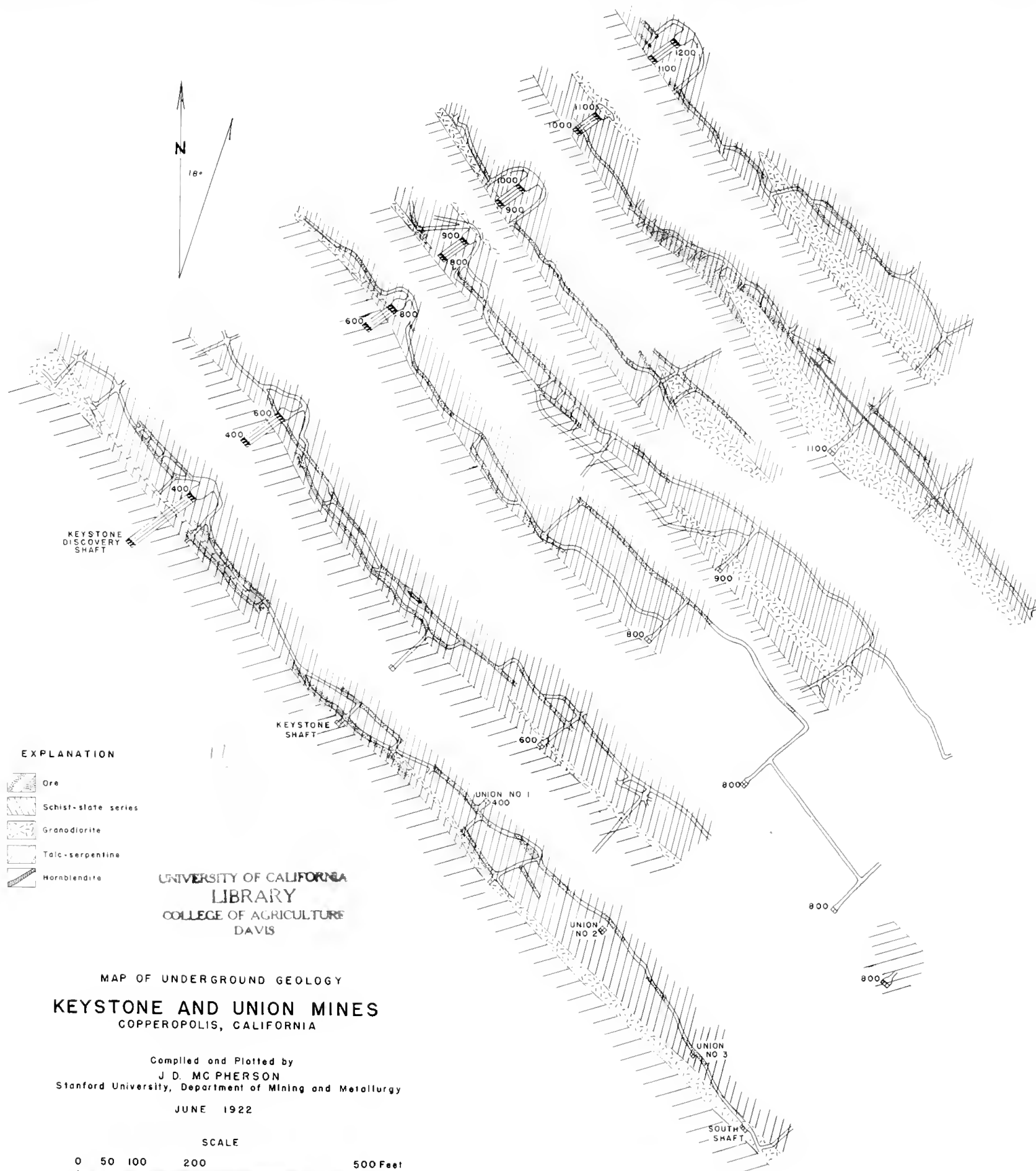
DIP NEEDLE SURVEY
of a portion of the
COPPEROPOLIS DISTRICT
CALAVERAS COUNTY, CALIFORNIA

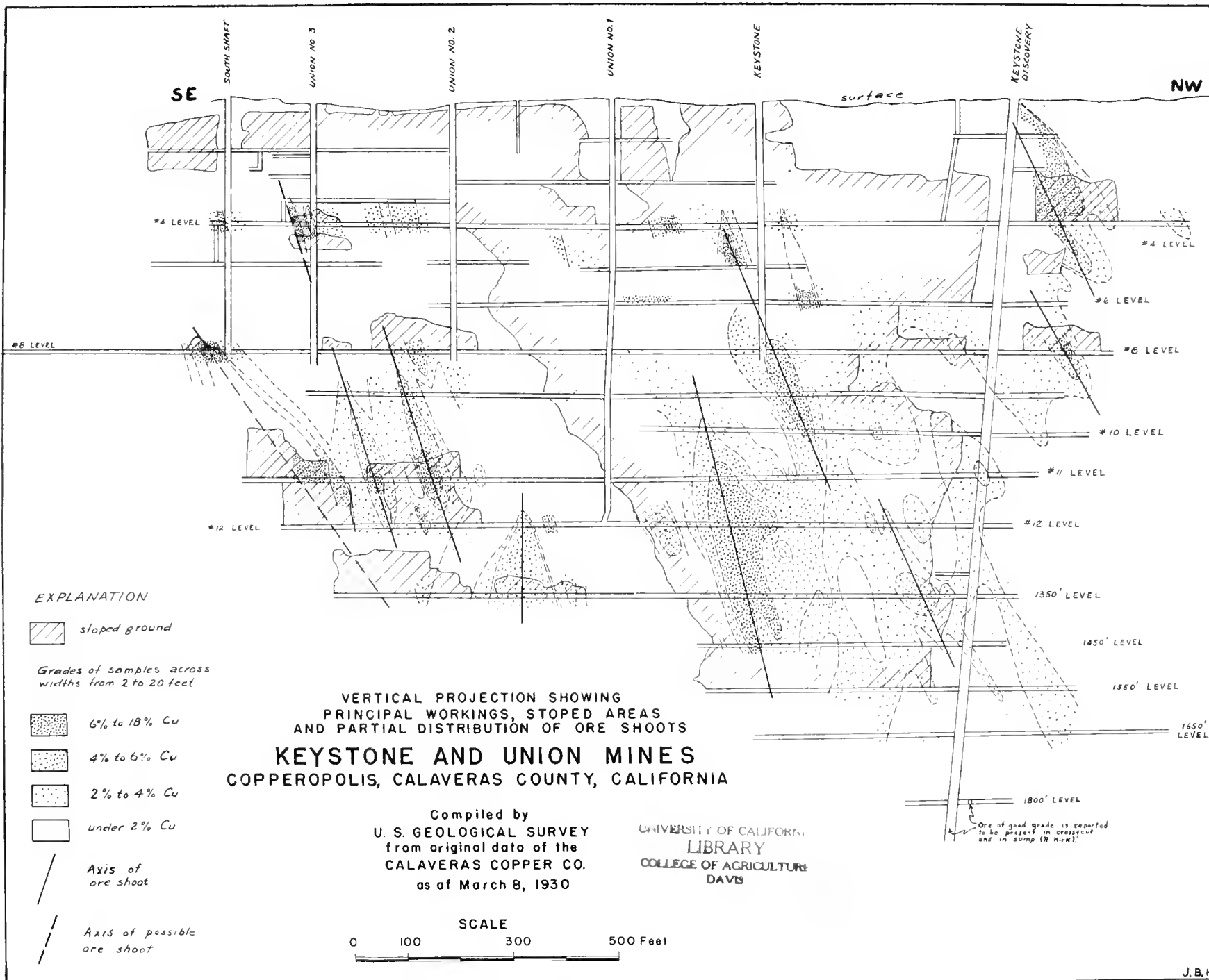
BY
G. R. HEYL, M. W. COX, D. G. WYANT AND J. H. ERIC
MAY 1944

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GEOLOGIC MAP AND SECTION
OF THE
EMPIRE TUNNEL
COPPEROPOLIS, CALAVERAS COUNTY, CALIFORNIA

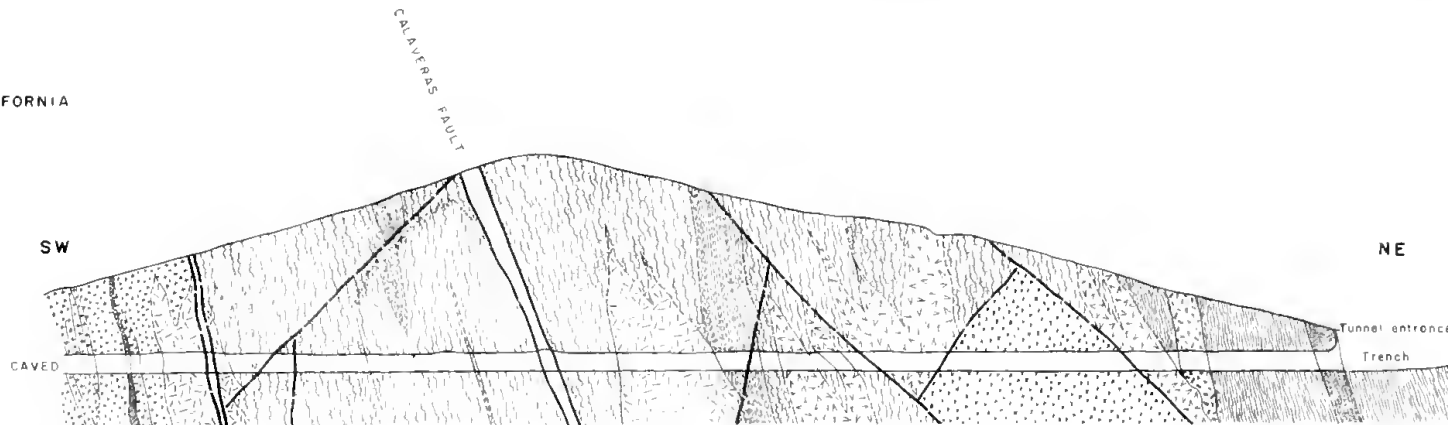
BY
G. R. MEYER AND M. W. COX

NOVEMBER 1943

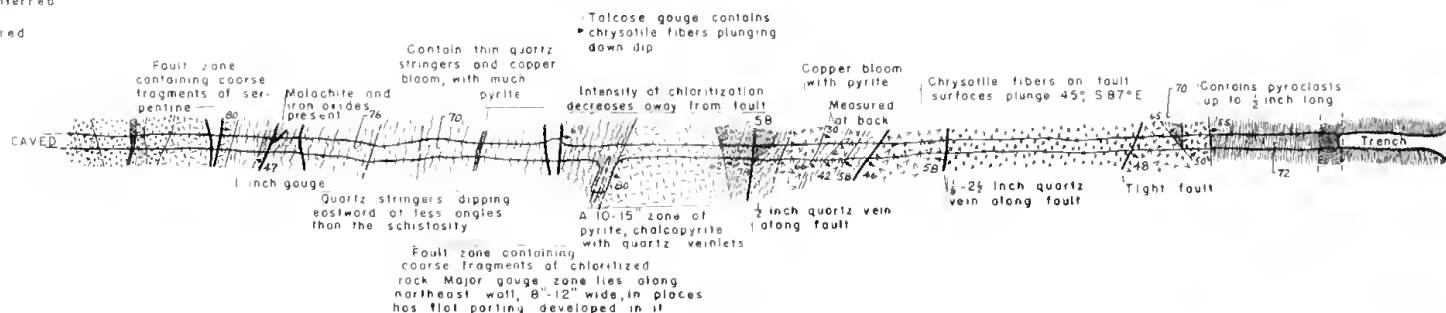
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EXPLANATION

-  Zone of quartz veins
-  Pyritized rock
-  Chloritized rock
-  Granodiorite
-  Hornblende diorite
-  Hornblendite
-  Schistose (sheared) soussuritized gabbro
-  Soussuritized gabbro
-  Serpentine
-  Felsite
-  Slaty pyroclastics
-  Slate
-  Green schist
-  Contact, showing dip, dashed where inferred
-  Fault, showing dip, dashed where inferred
-  Attitude of cleavage or schistosity



SCALE



GEOLOGIC MAP OF QUAIL HILL MINE AREA CALAVERAS CO. CALIFORNIA

BY
C.M. GILBERT J.B. HADLEY G.R. HEYL
U.S. GEOLOGICAL SURVEY





1945

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


EXPLANATION















 Gossion and pyritized rock

INTRUSIVE ROCKS

 Diabase porphyry and diabase
 Felsite porphyry
 Felsite
 Quartz porphyry breccia

VOLCANIC ROCKS

 Bedded tuffs with intercolated dacite and diabase
 Basaltic flows and volcanic breccia
 Light-colored bedded tuff
 Dacite and andesite flows

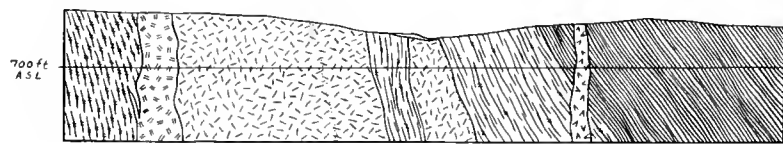
 Contact
 Contour line
 Strike and dip of beds
 Strike and dip of schistosity
 Strike and dip of joint
 Anticlinol axis showing plunge
 Synclinal axis showing plunge
 Road
 Shaft
 Caved shaft
 Small pit
 Open cut
 Adit and trench
 Mine dump

SCALE

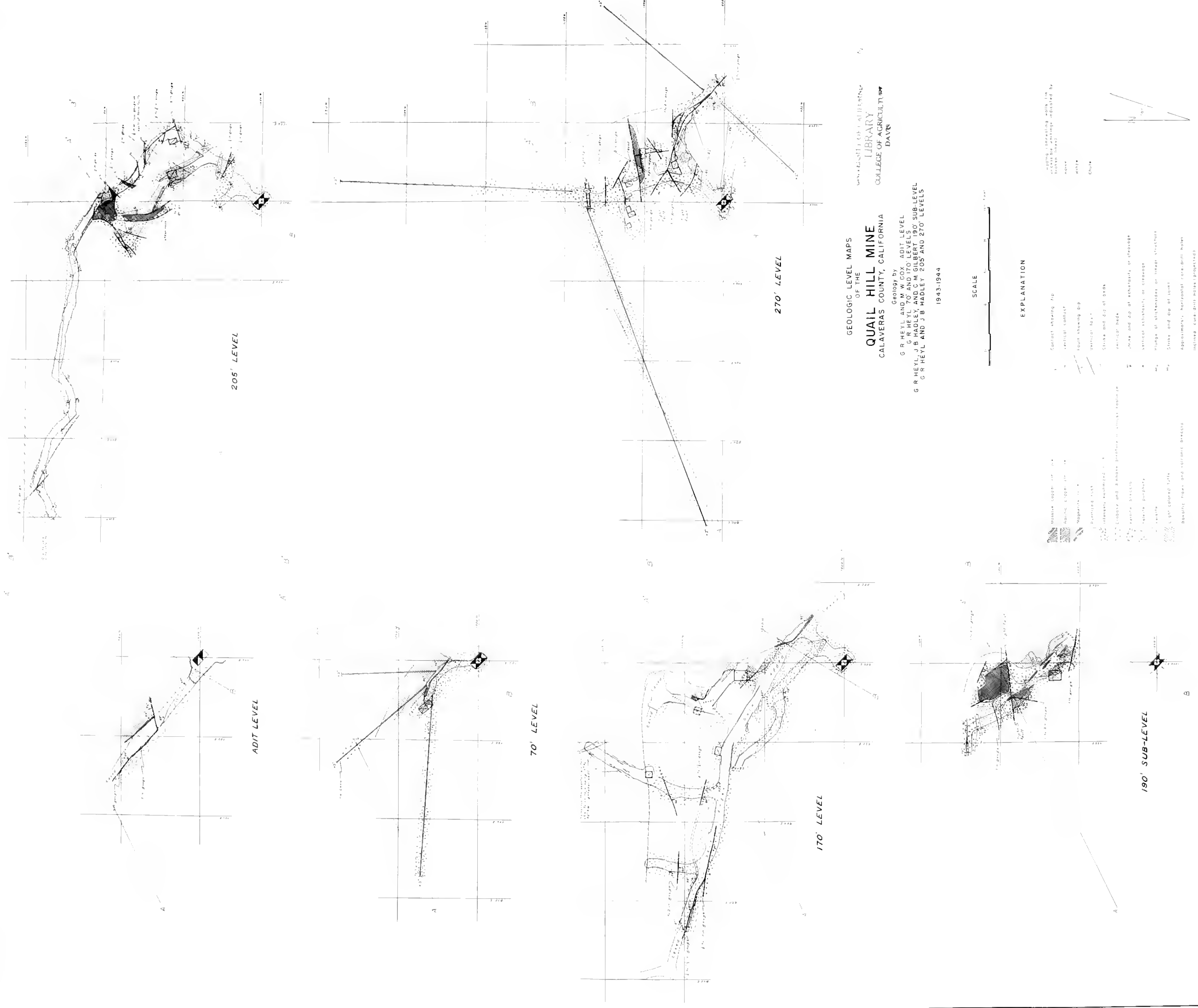
0 100 200 500 FEET
Contour interval 20 feet
Datum approximate sea level

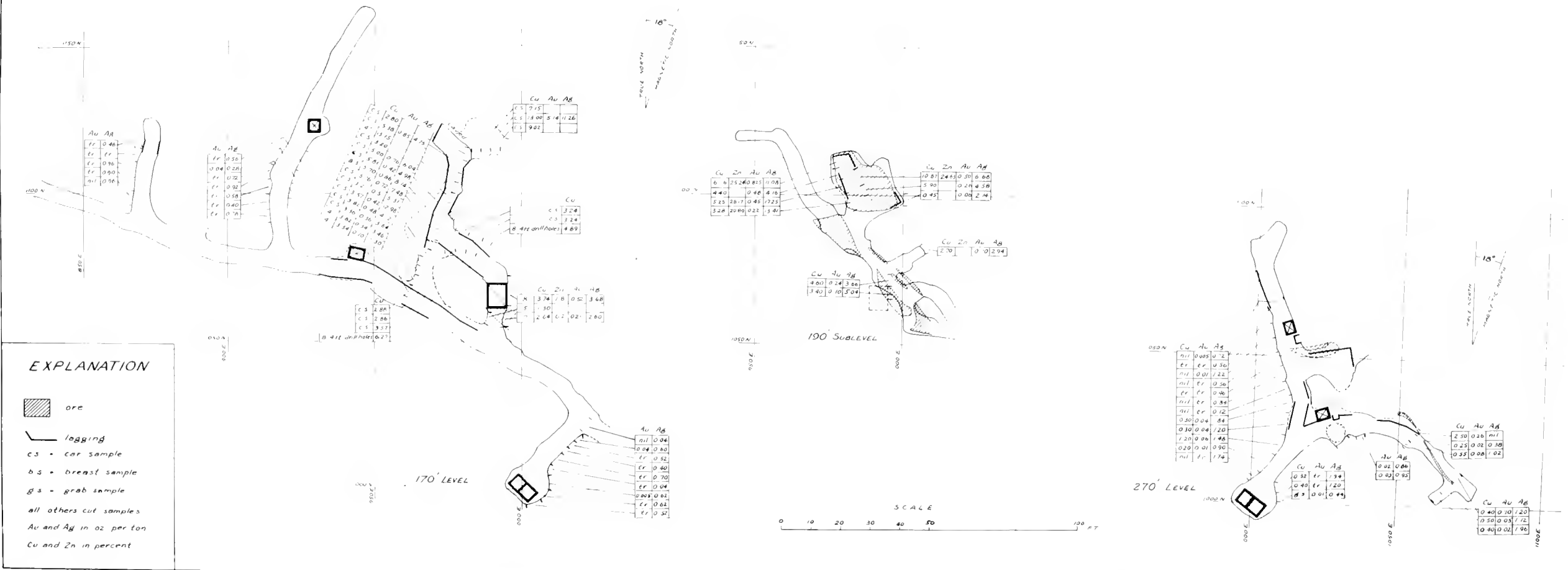
SW

NE



GEOLOGIC SECTION Y-Y'

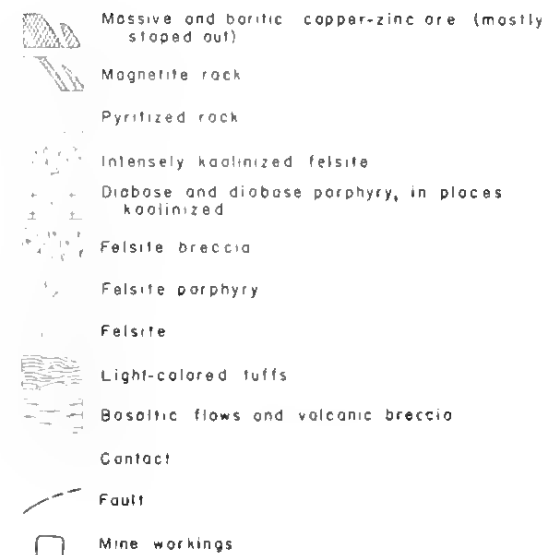


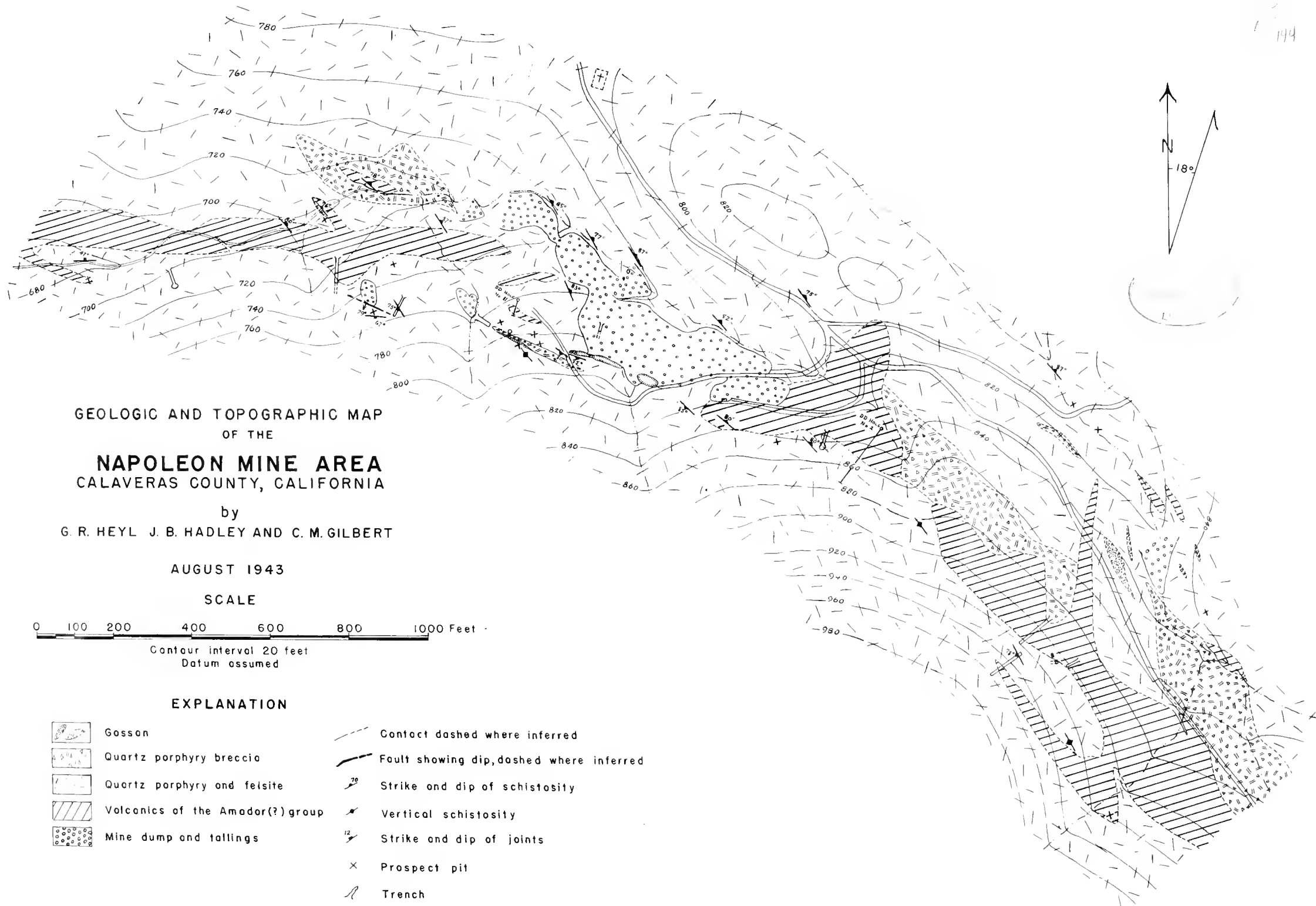


Base by U.S. Geological Survey, 1943

ASSAY MAP OF THE QUAIL HILL MINE BASED ON DATA FROM THE PACIFIC MINING CO AND OTHER SOURCES

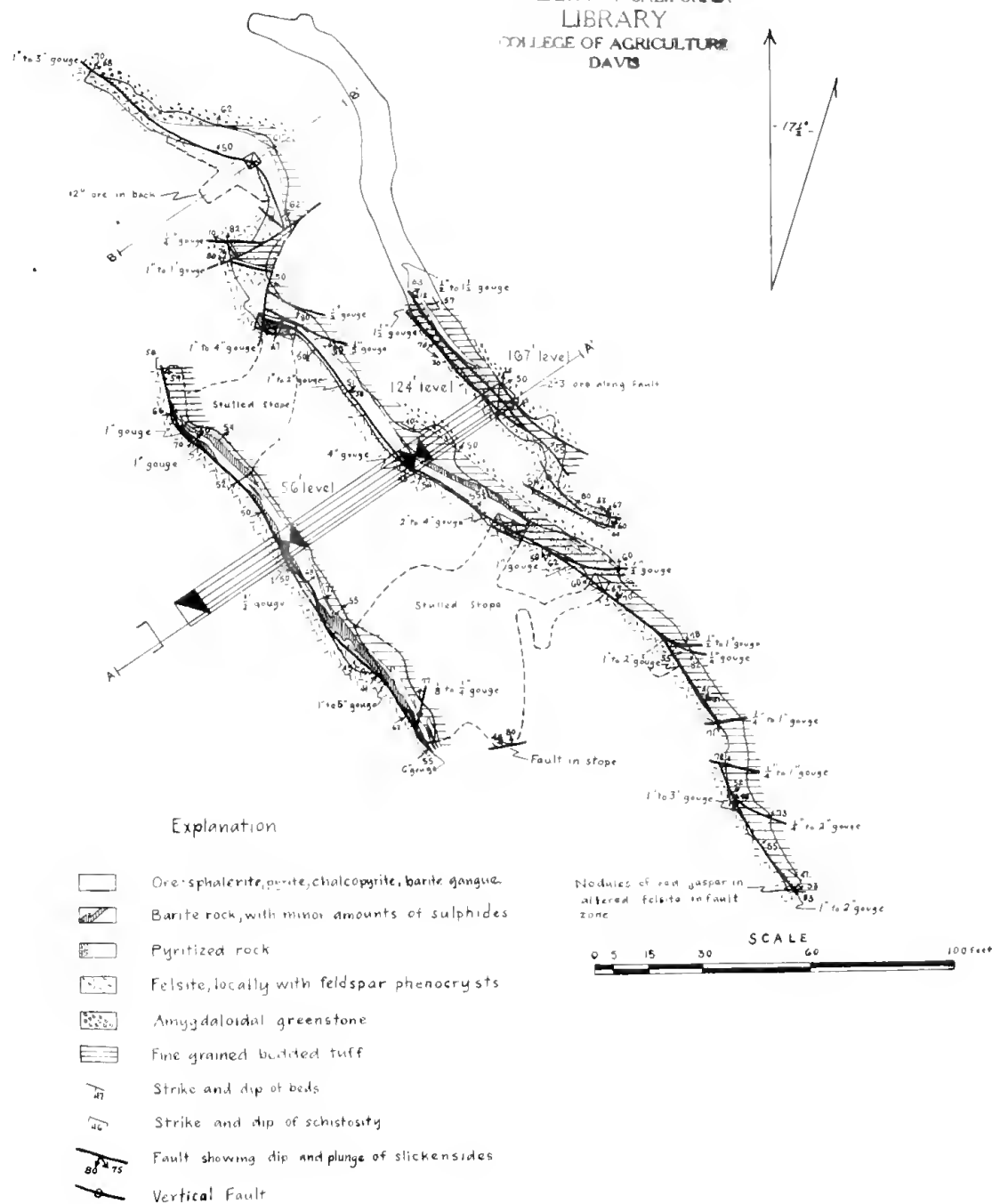
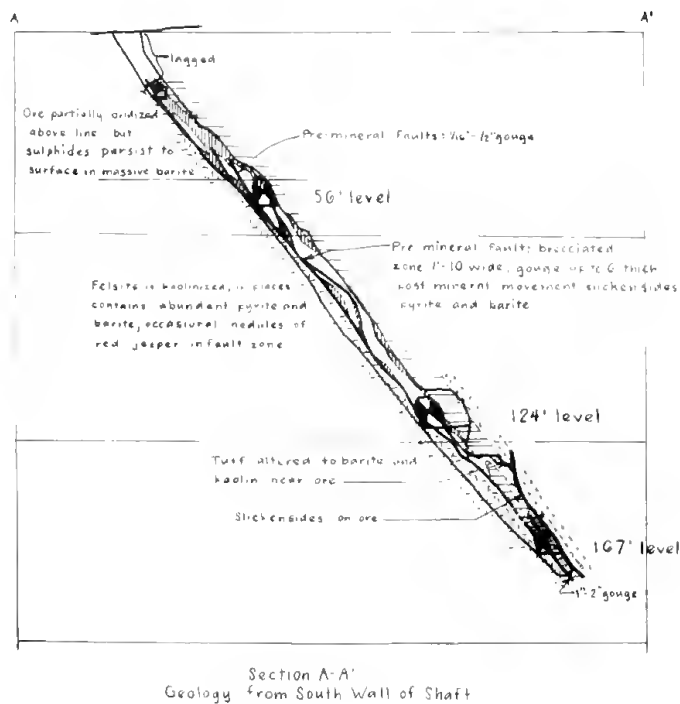
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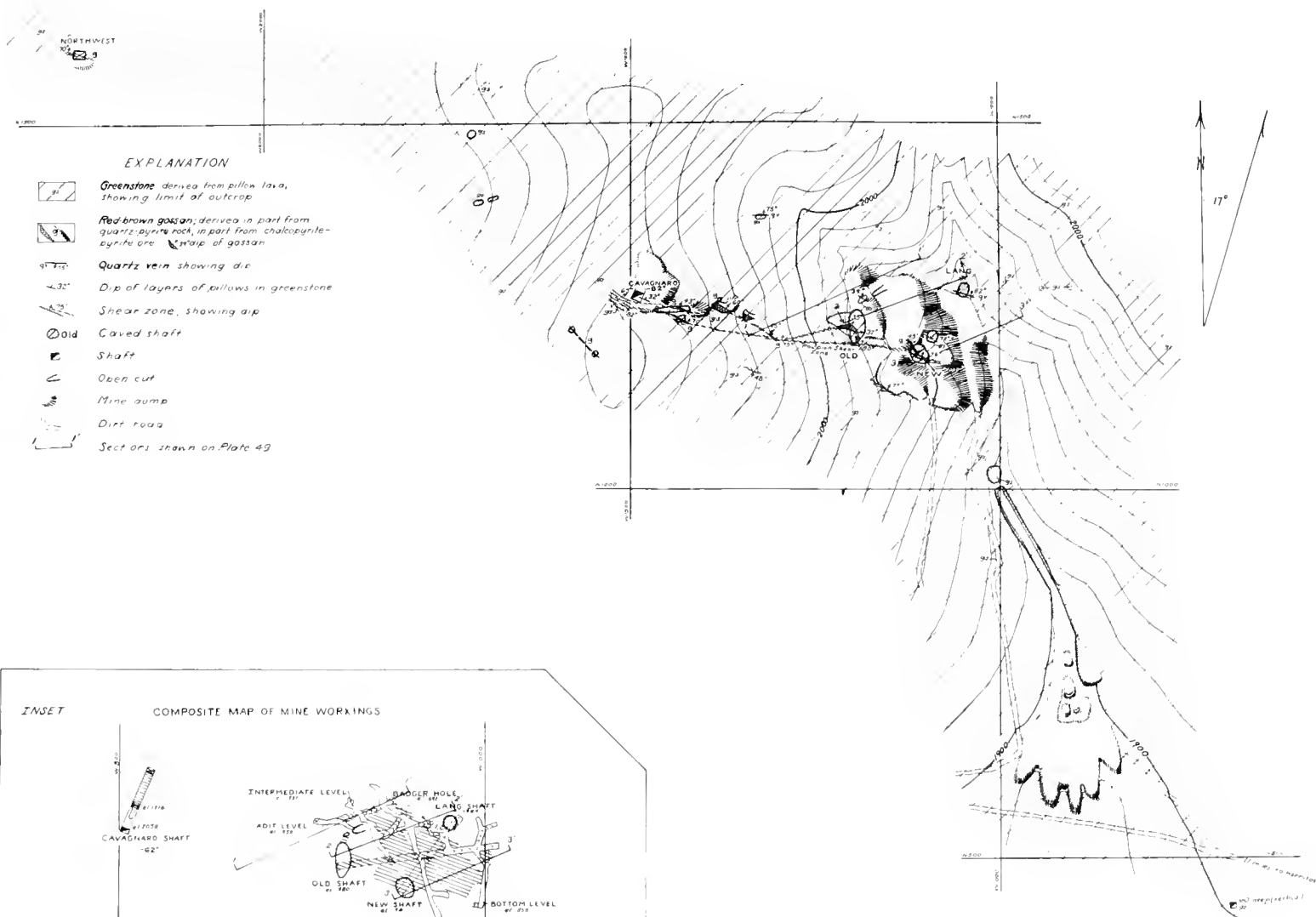




JANUARY 1944

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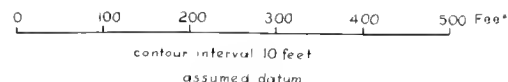
GEOLOGIC MAP
OF
LA VICTORIA MINE
MARIPOSA COUNTY, CALIFORNIA

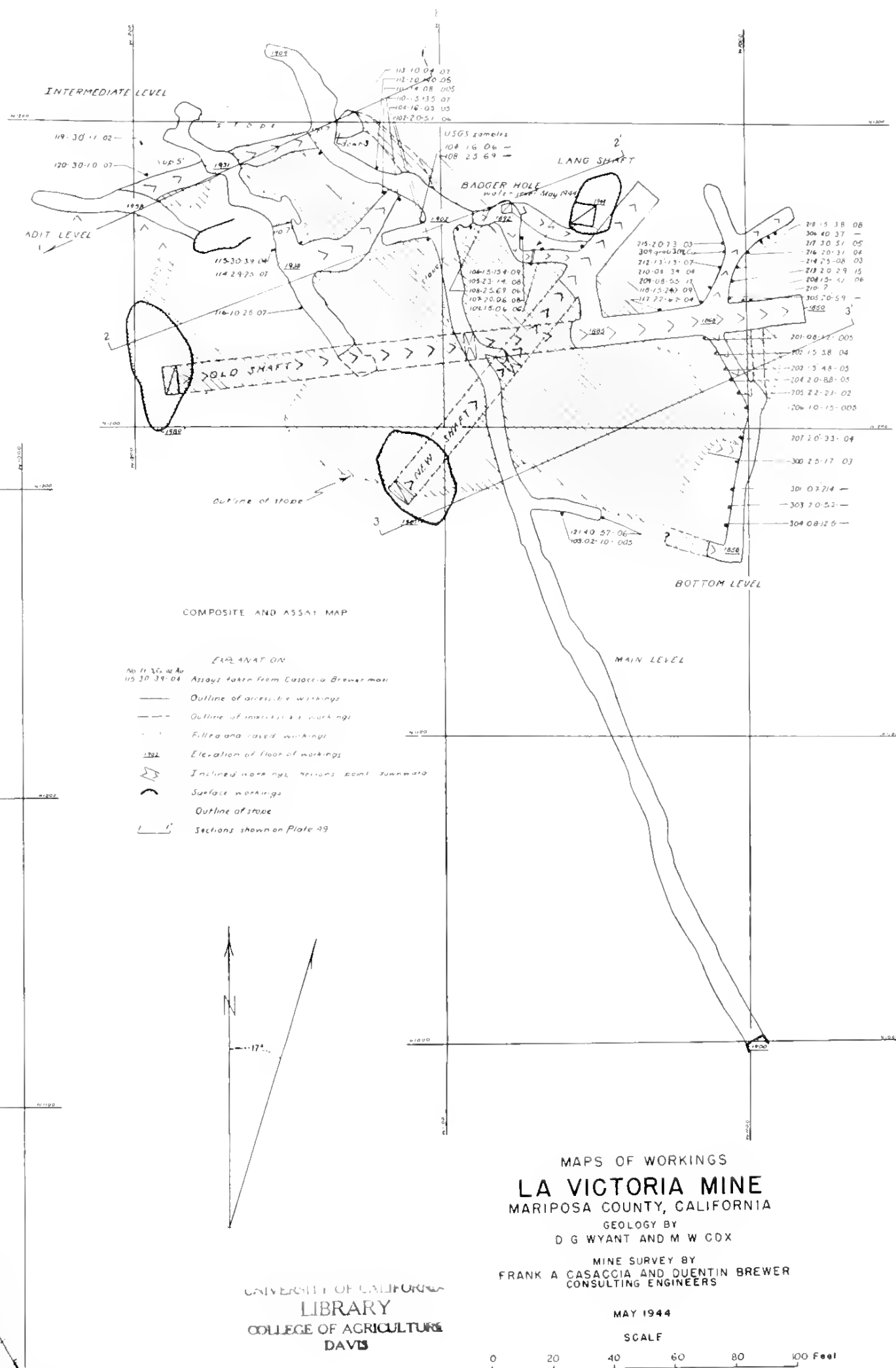
BY
D. G. WYANT AND M. W. COX

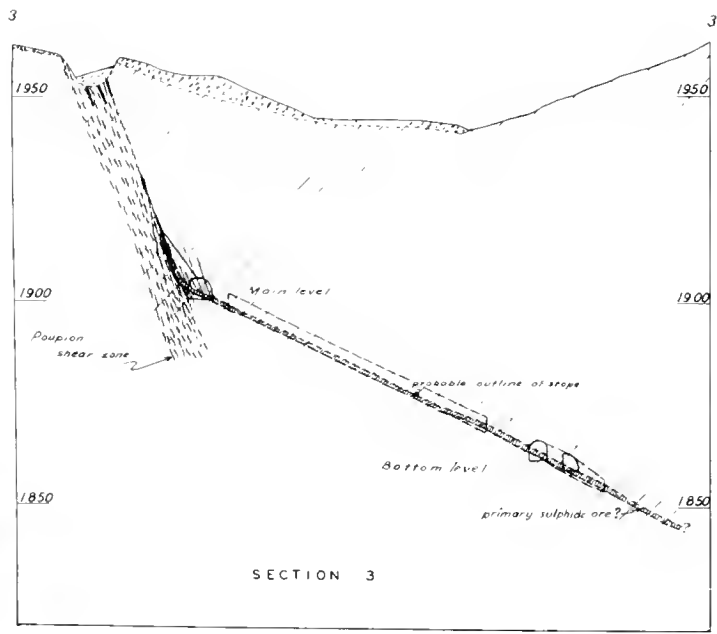
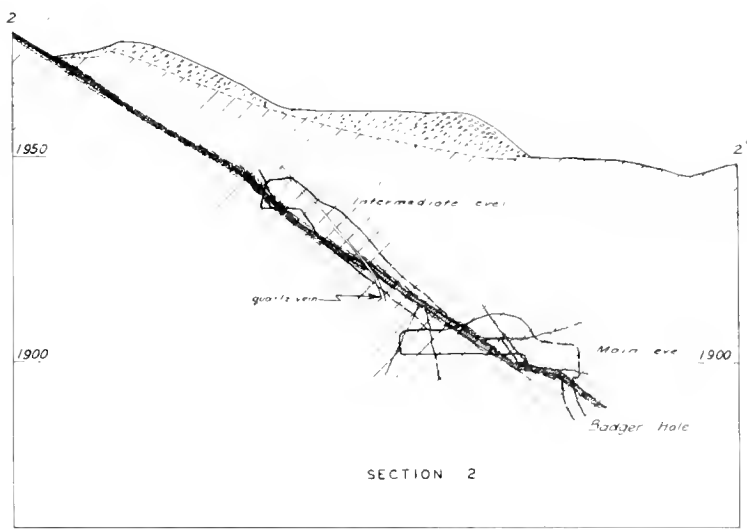
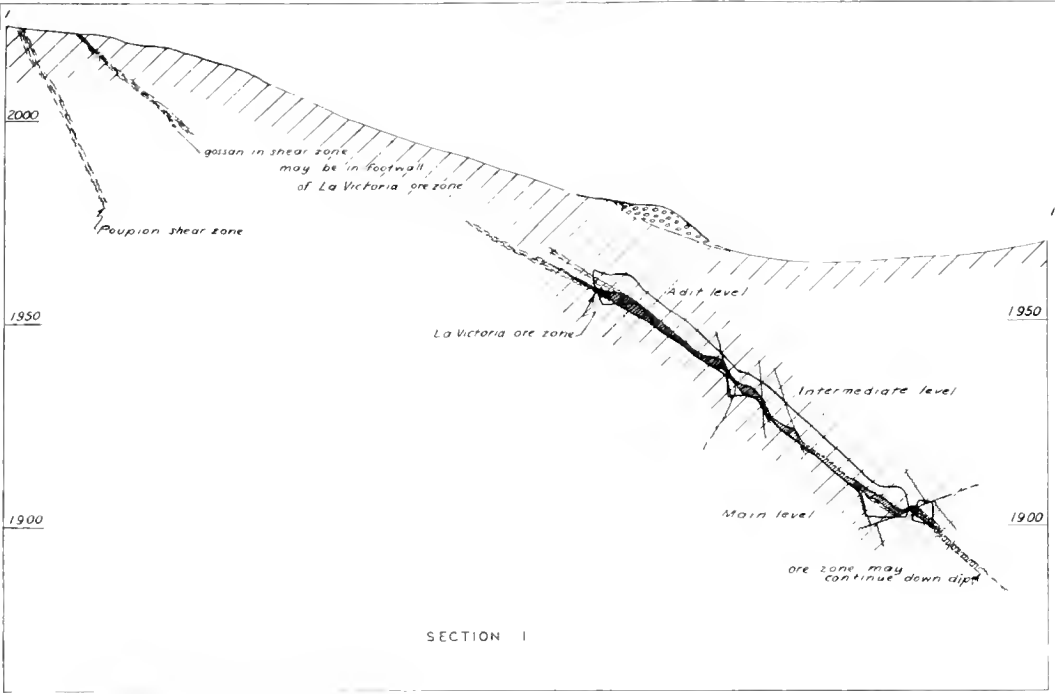
MAY 1944

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SCALE







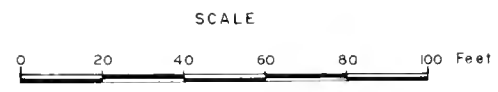
- EXPLANATION
- Greenstone derived from pillow lava
 - Red-brown gossan
 - Copper carbonate-sulphate ore, includes some quartz pyrite ore
 - Fault
 - Shear zone
 - Mine dump

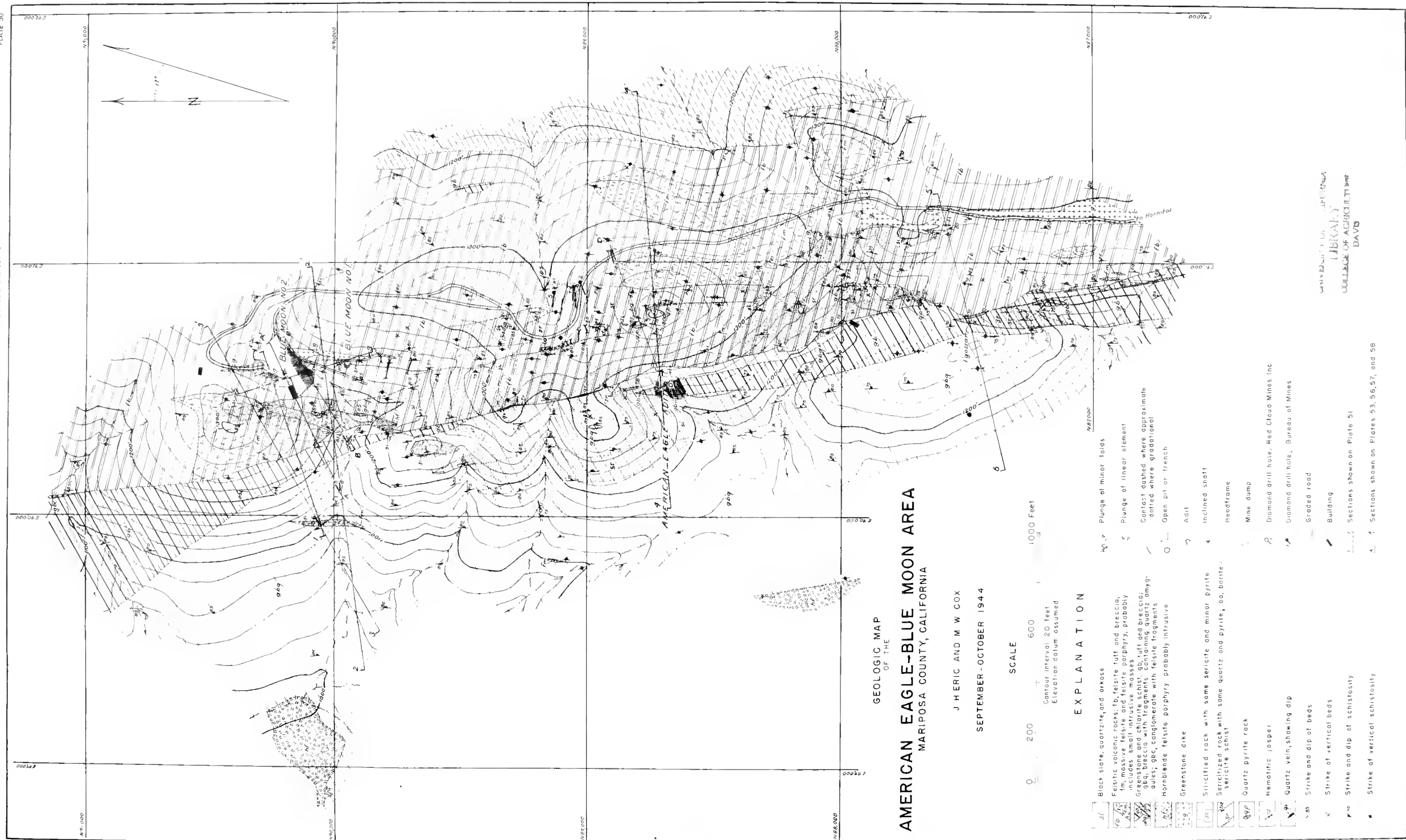
SECTIONS
LA VICTORIA MINE
MARIPOSA COUNTY, CALIFORNIA

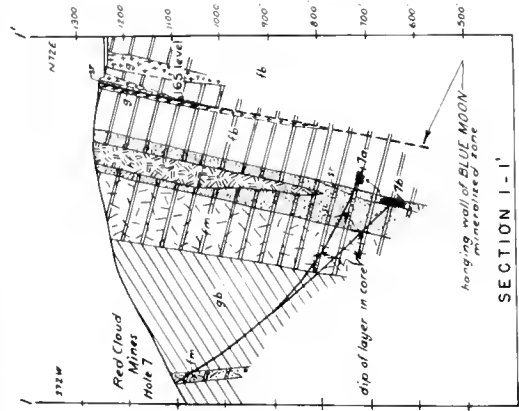
BY
D G WYANT AND M W COX

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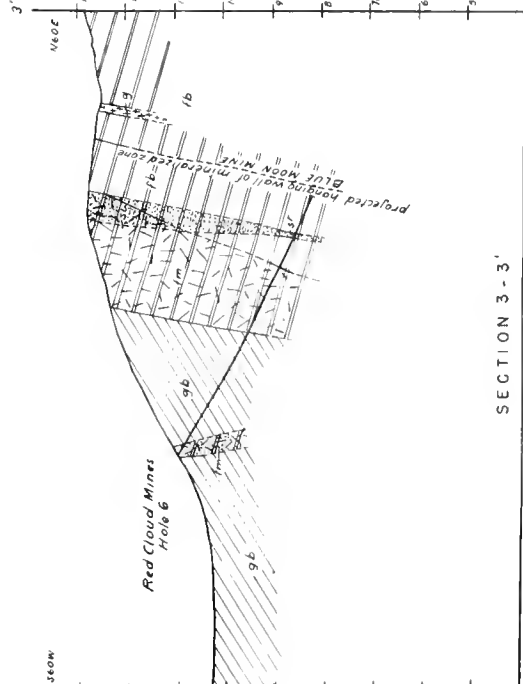
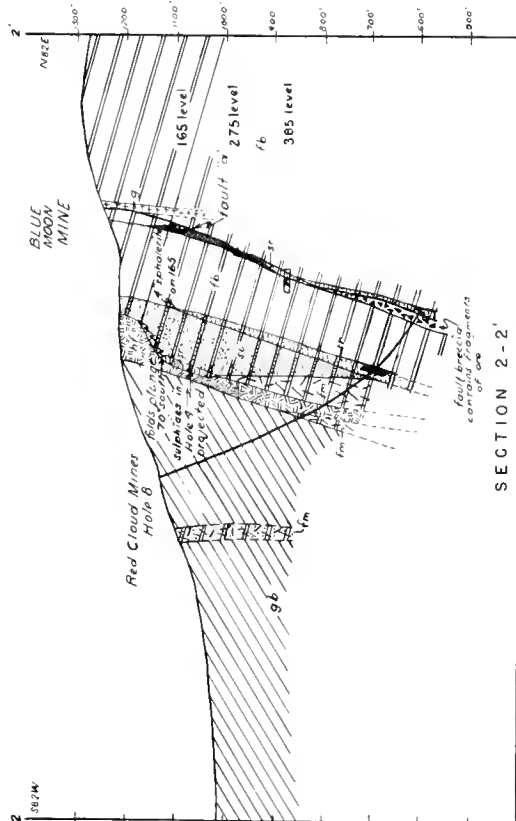




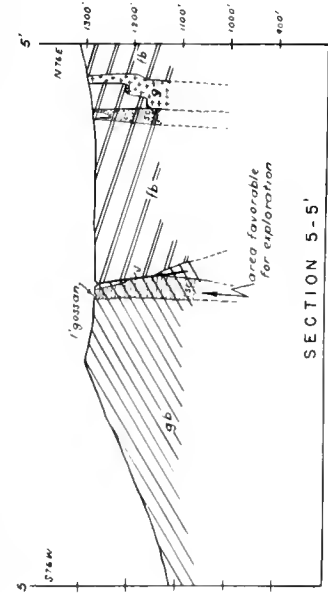
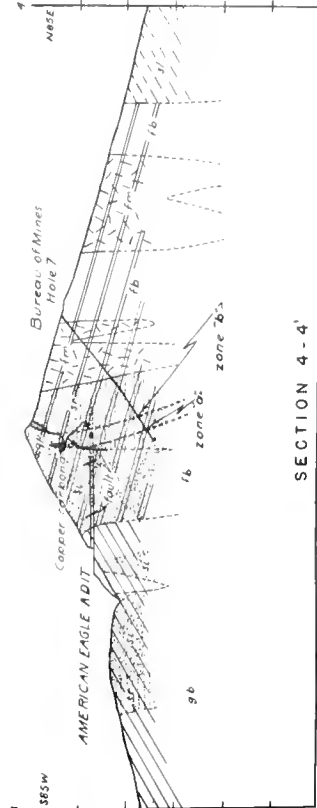


EXPLANATION FOR SECTIONS

- Block slate quartzite and orkose
- Felsite tuff and breccio
- Mossive felsite
- Greenstone and chlorite schist
- Hornblende felsite porphyry
- Greenstone dike
- Silicified rock
- Sericitized rock
- Quartz-pyrite rock
- Hematitic jasper
- Zinc ore
- Fault breccio



Two surveys of vertical angles in hole 7 failed to agree. The two possible positions of hole 7, assuming no horizontal deviation, are shown in the vertical projection and section 1-1'

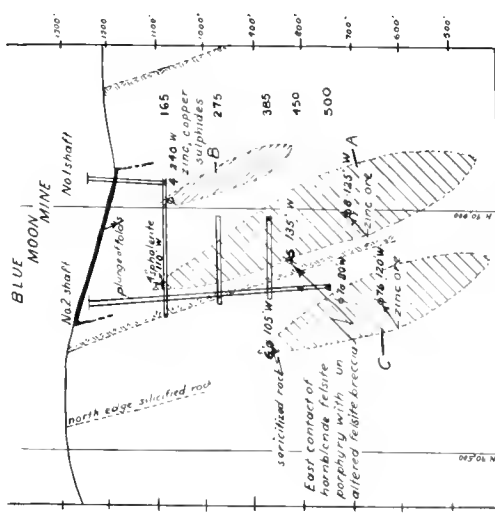


SECTIONS AND VERTICAL PROJECTION
AMERICAN EAGLE-BLUE MOON AREA
MARIPOSA COUNTY, CALIFORNIA

BY
J H ERIC AND M W COX
OCTOBER 1944



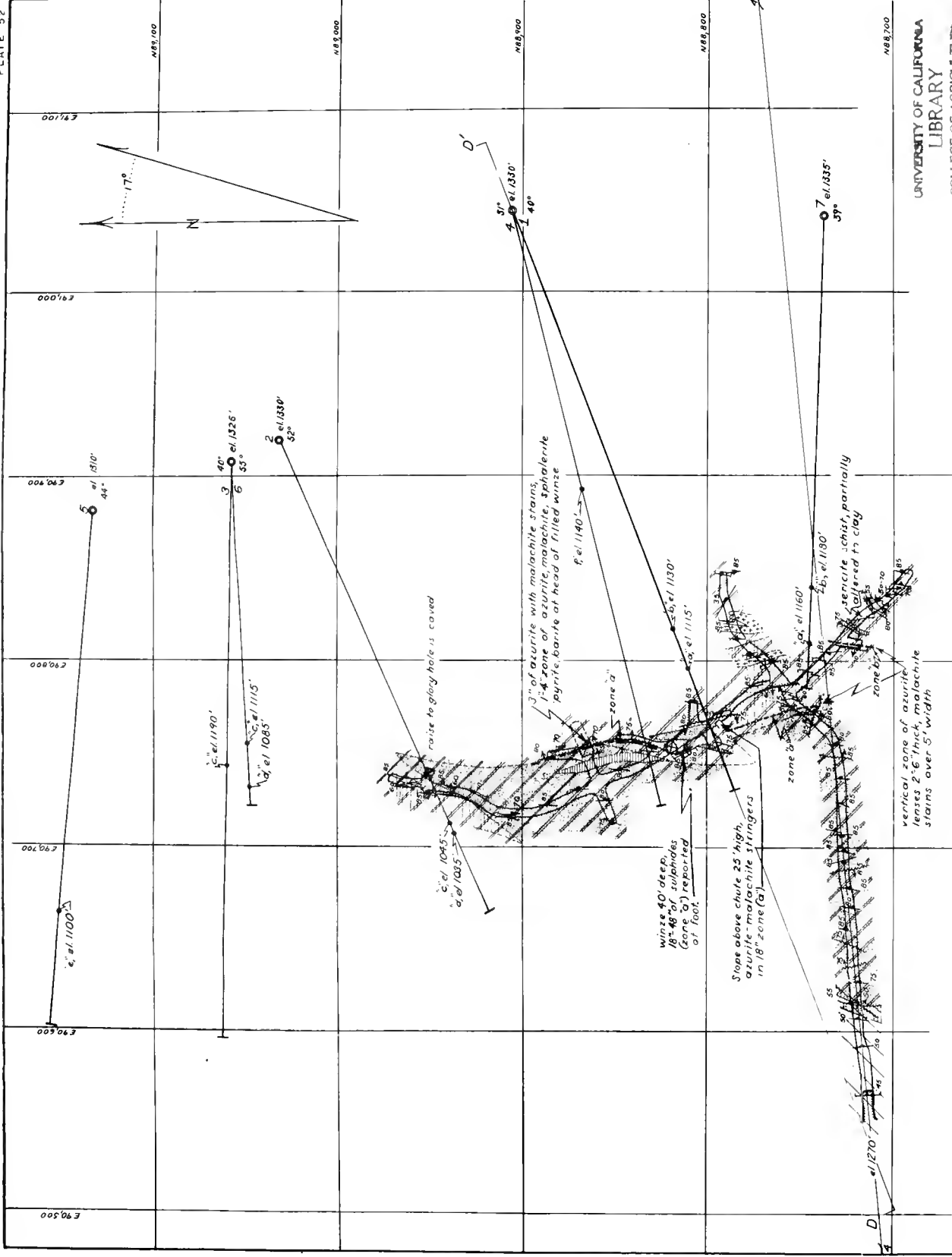
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VERTICAL PROJECTION OF POSSIBLE MINERALIZED AREAS, WEST SILICIFIED ZONE

EXPLANATION FOR PROJECTION

- Mineralized area at east edge of silicified rock
- Mineralized area at west edge of silicified rock
- Point intersected by drill hole B, 125' west of no 1 ore body
- Limits of hornblende felsite porphyry
- North trending part of east edge of silicified rock
- Area described in text



EXPLANATION

- Chlorite schist, volcanic breccia with fragments containing quartz, amygdales
- Felsite tuff and breccia
- Greenstone dike
- Silicified rock with some sericite, pyrite, and iron oxide, after pyrite
- Sericitized rock with some quartz
- Quartz pyrite rock with iron oxide
- Mineralized zone
- Diamond drill hole showing intersection with mineralized zone

- Contact, showing dip
- Fault, showing dip
- Strike and dip of schistosity
- Strike of vertical schistosity
- Folded schistosity showing plunge of folds, and average dip of schistosity
- Plunge of minute crinkles in schistosity
- Strike and dip of joint
- Head of winze
- Foot of raise

D_1 D_2 Sections shown on plates 51 and 53

GEOLOGIC MAP OF THE

AMERICAN EAGLE ADIT MARIPOSA COUNTY, CALIFORNIA

SURVEYED BY
J H ERIC AND M W COX

SHOWING LOCATION OF BUREAU OF MINES DRILL HOLES

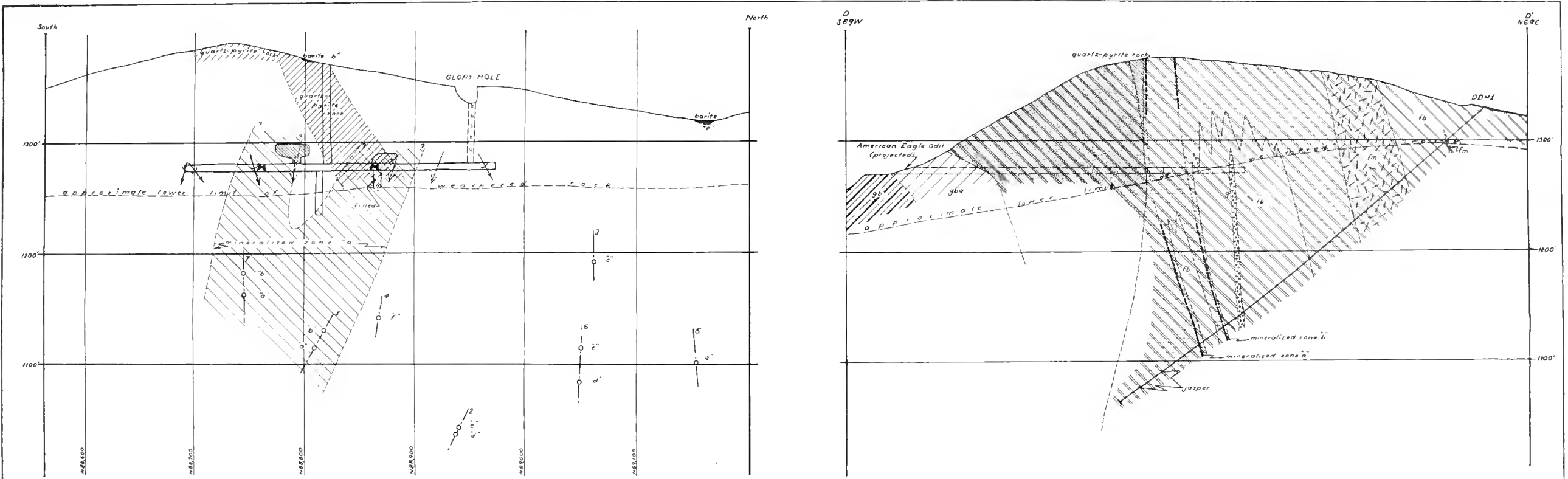
OCTOBER 1944

SCALE



Datum assumed

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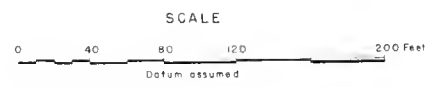


SECTION AND VERTICAL PROJECTION
OF THE
AMERICAN EAGLE PROSPECT
MARIPOSA COUNTY, CALIFORNIA

BY
J. H. ERIC AND M. W. COX
SHOWING BUREAU OF MINES DRILL HOLES

OCTOBER 1944

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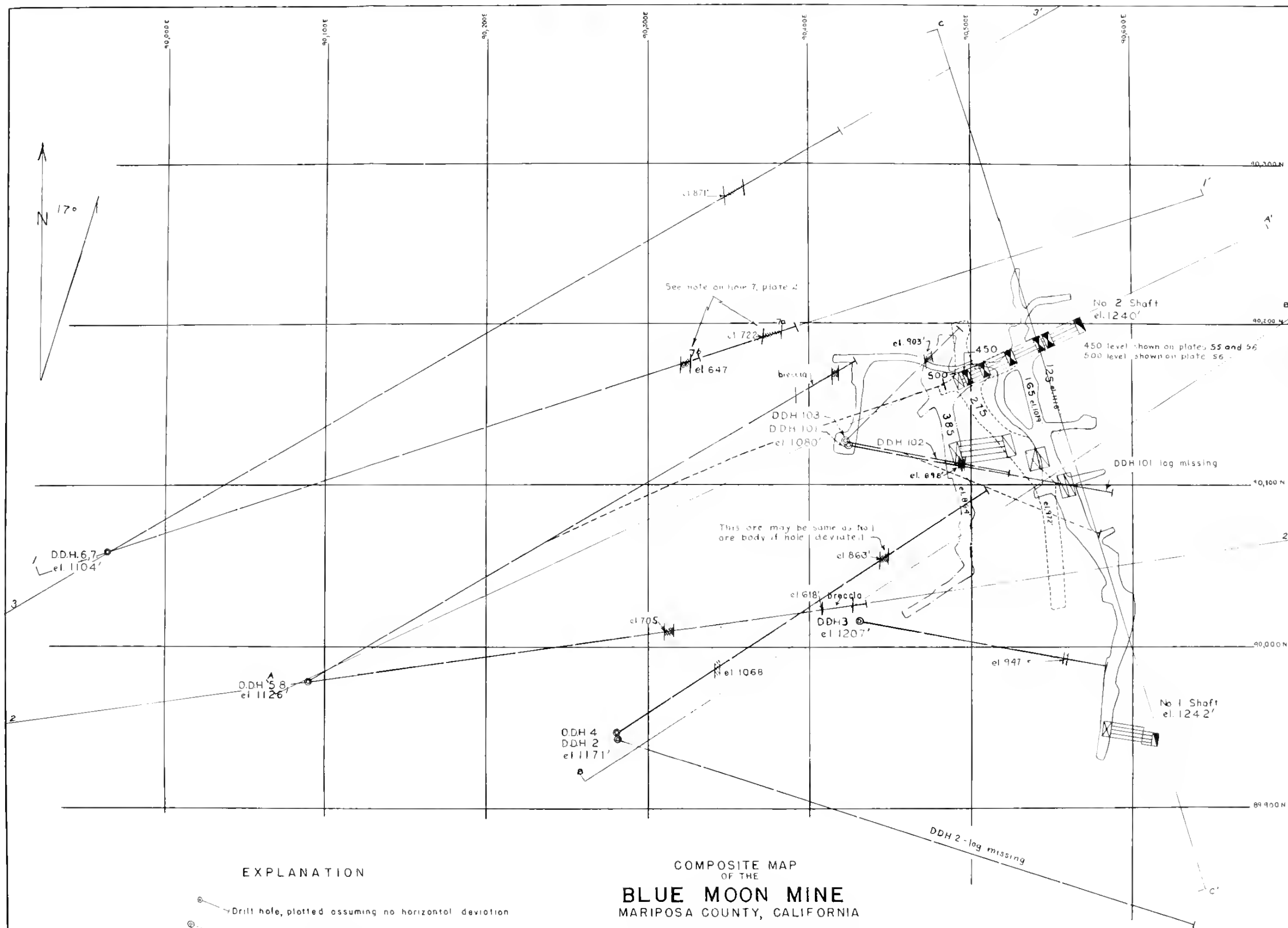


SECTION D-D'

EXPLANATION

- Felsite tuff and breccia
- Massive felsite
- Green schist, volcanic tuff and breccia
- Green schist, breccia fragments contain quartz amygdalites
- Greenstone dike
- Silicified rock
- Sericitized rock
- Quartz-pyrite rock
- Mineralized zone

- VERTICAL PROJECTION
EXPLANATION
- Mineralized zone intersected in drill hole
 - Sloped ground in mineralized zone 'a'
 - letters, as 'a', refer to mineralized zones*
 - Pitch of minor fold in schistosity
 - Pitch of minute crinkles in schistosity
 - Cross cut towards and away from observer



EXPLANATION

- Drill hole, plotted assuming no horizontal deviation
- ⊙ Drill hole, intersected by workings
- Zinc ore, intersected by hole
- Sulphides, intersected by hole
- A—A Sections shown on plates 56, 57 and 58
- Section shown on plate 51

COMPOSITE MAP OF THE **BLUE MOON MINE** MARIPOSA COUNTY, CALIFORNIA SHOWING DIAMOND DRILL HOLES - RED CLOUD MINES INC - 1941

UNDERGROUND WORKINGS SURVEYED BY
M W COX FEBRUARY 1944
J H ERIC OCTOBER 1945

DRILL DATA FROM
J H A WILLIAMS

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GEOLOGIC LEVEL MAPS
OF THE
BLUE MOON MINE
MARIPOSA COUNTY, CALIFORNIA

SURVEYED BY
M. W. COX AND J. H. ERIC

1944-1945

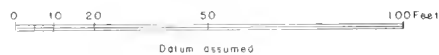
EXPLANATION

- Zinc ore, sphalerite with pyrite in sericite-barite gangue, more than 25% sulphide
- Low grade schistose ore, sericite schist containing sphalerite, pyrite, and barite
- Sericite schist containing numerous films of pyrite
- Felsite tuff and breccia
- Massive felsite breccia
- Quartz sericite schist containing irregular masses of barite (felsite breccia)
- Greenstone, non-schistose, pyritized and schistose near ore
- Fault breccia containing angular fragments of ore and country rock

- Contact, showing dip
- Fault, showing dip
- Vertical fault
- Fault zone showing average dip of faults
- Strike and dip of schistosity
- Vertical schistosity

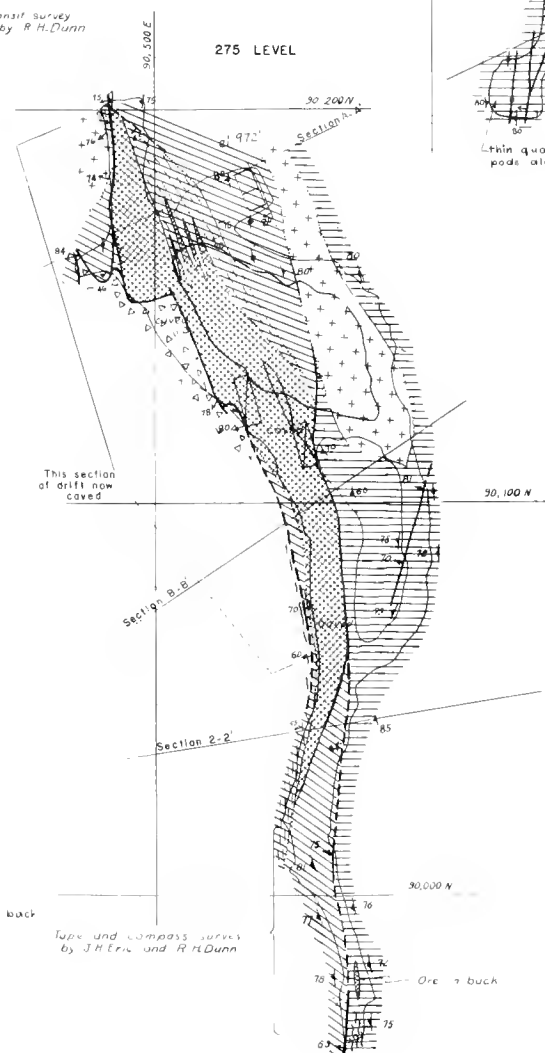
Main drifts are capped and logged in back
Ore and breccia contacts are drawn in part
from information furnished by mine foreman

SCALE



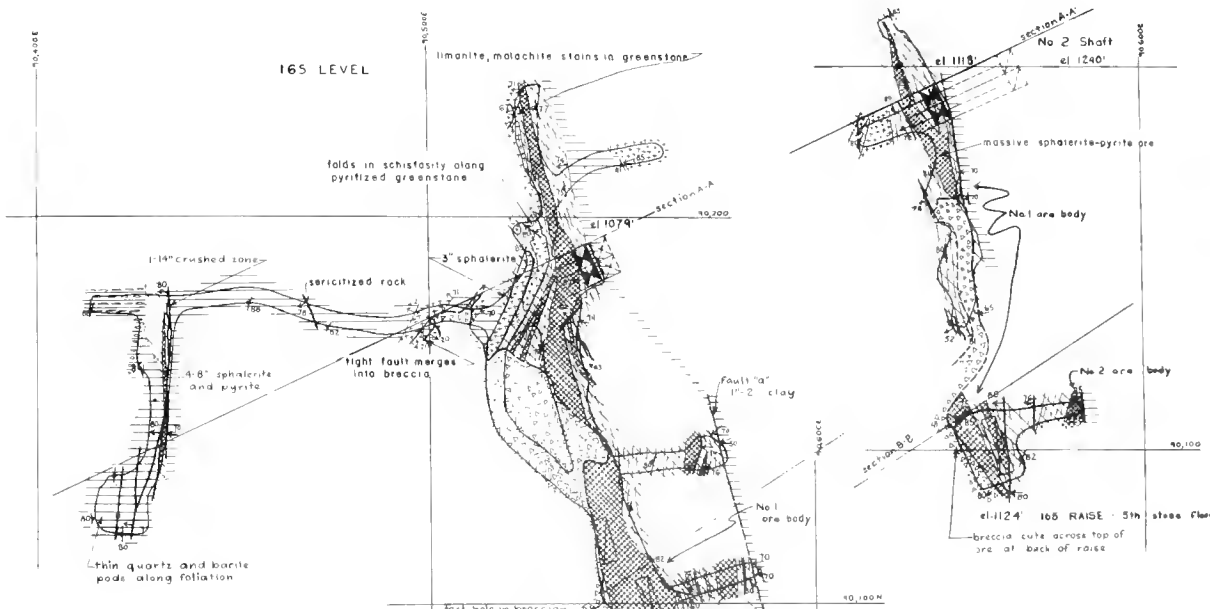
Transit survey
by R. H. Dunn

275 LEVEL

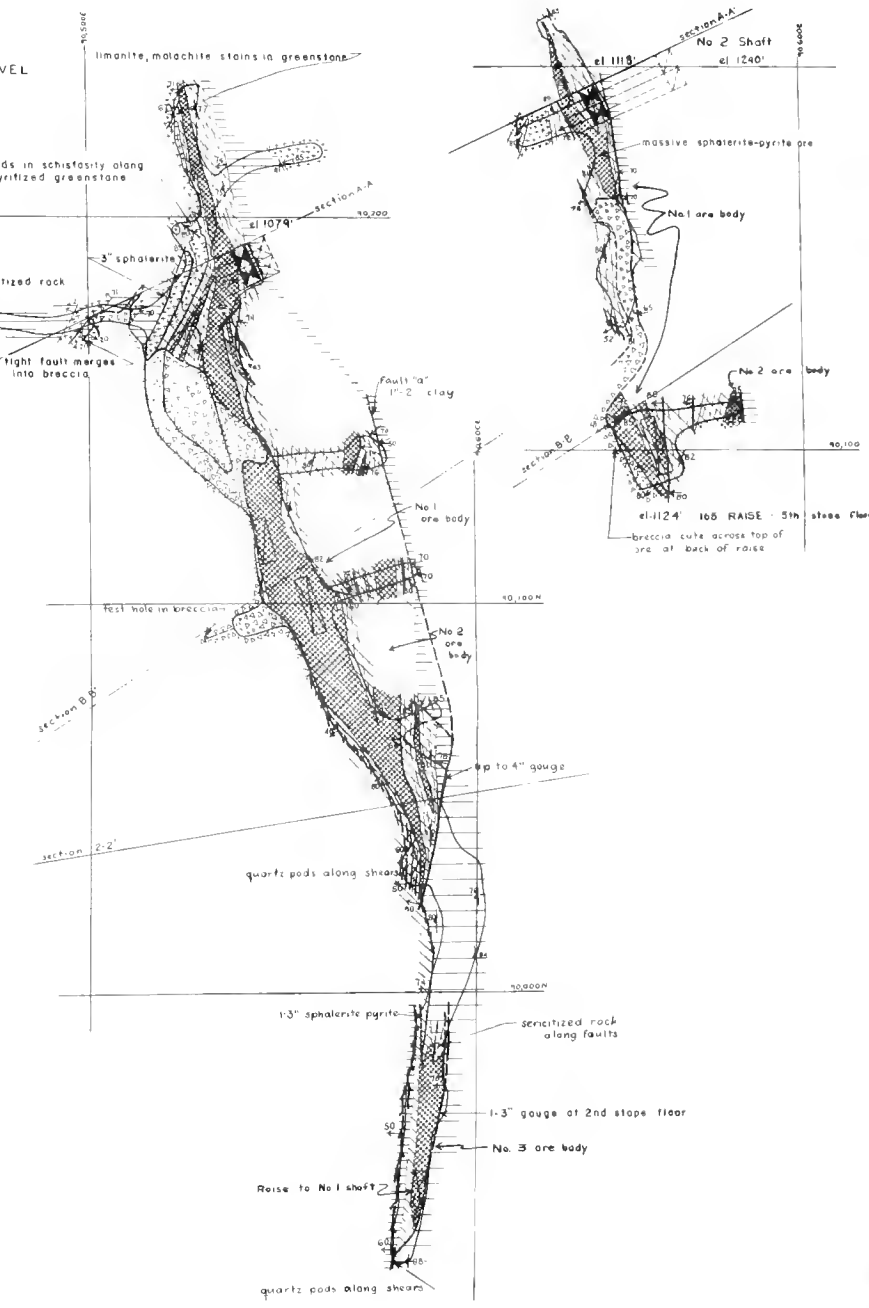


Tape and compass surveys
by J. H. Eric and R. H. Dunn

165 LEVEL

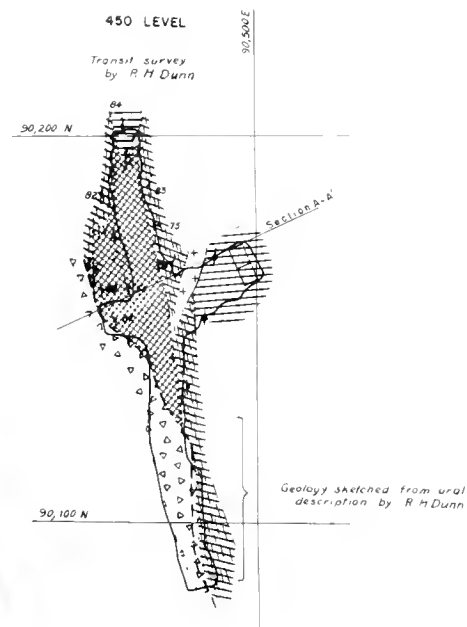


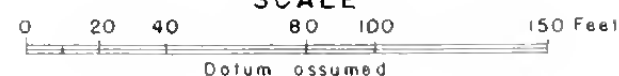
125 LEVEL



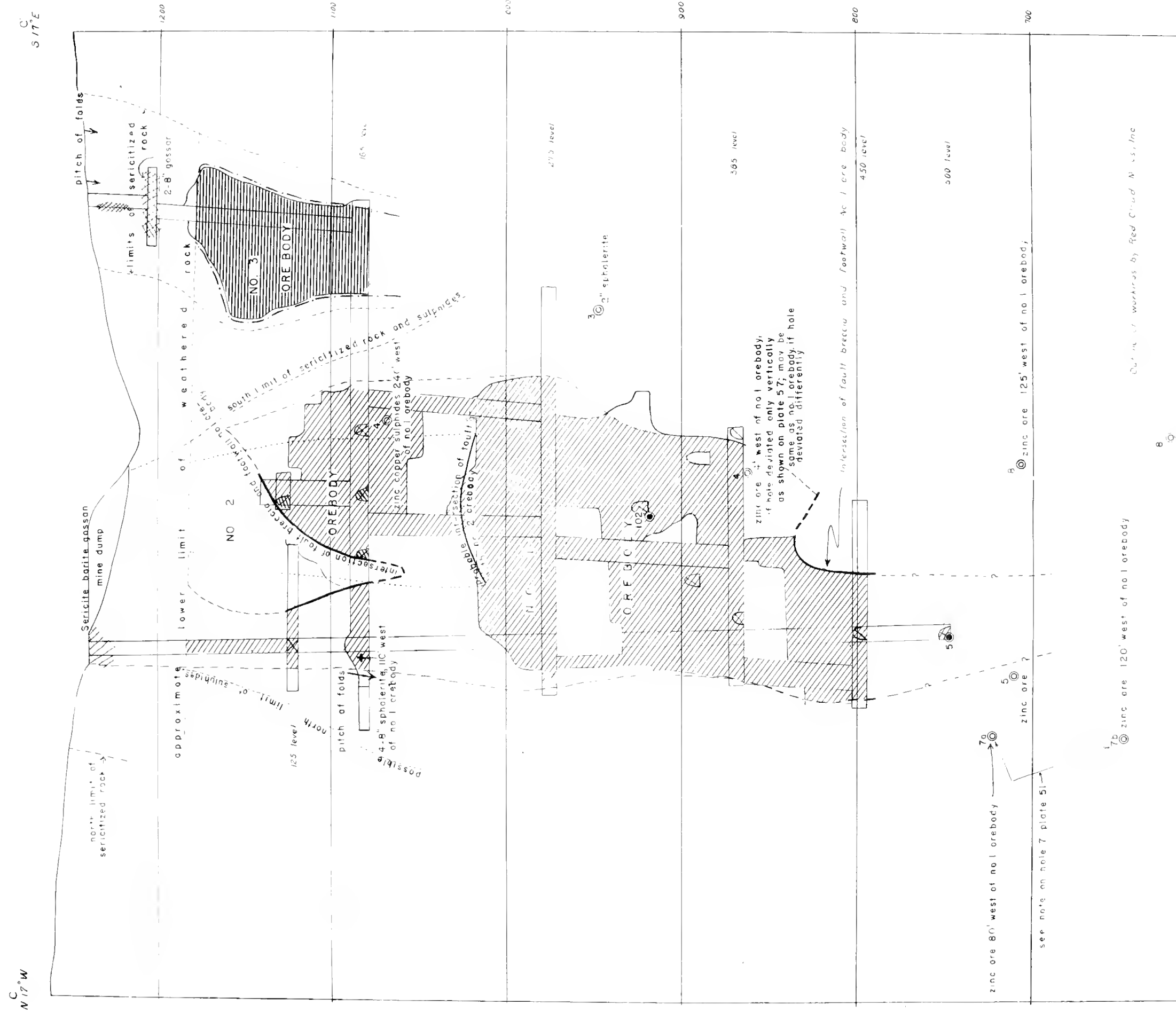
450 LEVEL

Transit survey
by R. H. Dunn









EXPLANATION

- Gossan
- Workings in no. 1 orebody
- Outline of orebody
- Workings in no. 2 orebody
- Outline of orebody
- Workings in no. 3 orebody
- Outline of orebody
- Point in drill hole plotted assuming no horizontal deviation
- Point in drill hole intersected in mine

- Grosscut towards observer
- Grosscut away from observer



VERTICAL PROJECTION ALONG LINE C-C'

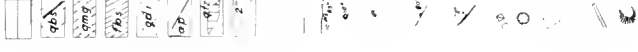
BLUE MOON MINE
MARIPOSA COUNTY, CALIFORNIA

J. H. ERIC
M. W. COX

1944 - 1945

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EXPLANATION



- Covered area
- Quartz biotite schist; pattern indicates strike of schistosity, individual bed
- Quartz-muscovite gneiss; pattern indicates strike of schistosity
- Feldspar-biotite schist
- Porphyritic quartz diorite
- Aplite
- Massive quartz vein
- Quartz vein with graphite, mica, and sulphides; width of gossan outcrops shown
- Geologic contact, dash line where approximate
- Fault or shear zone, showing dip of fault and strike and dip of schistosity
- Vertical joint
- Solid joint symbol indicates quartz coating
- Strike and dip of schistosity, except where otherwise noted schistosity and bedding are parallel
- Strike and dip of bed
- Shaft and headframe
- Open pit
- Building
- Dirt road
- Projection of 100 and 300 mine levels
- Mine dump



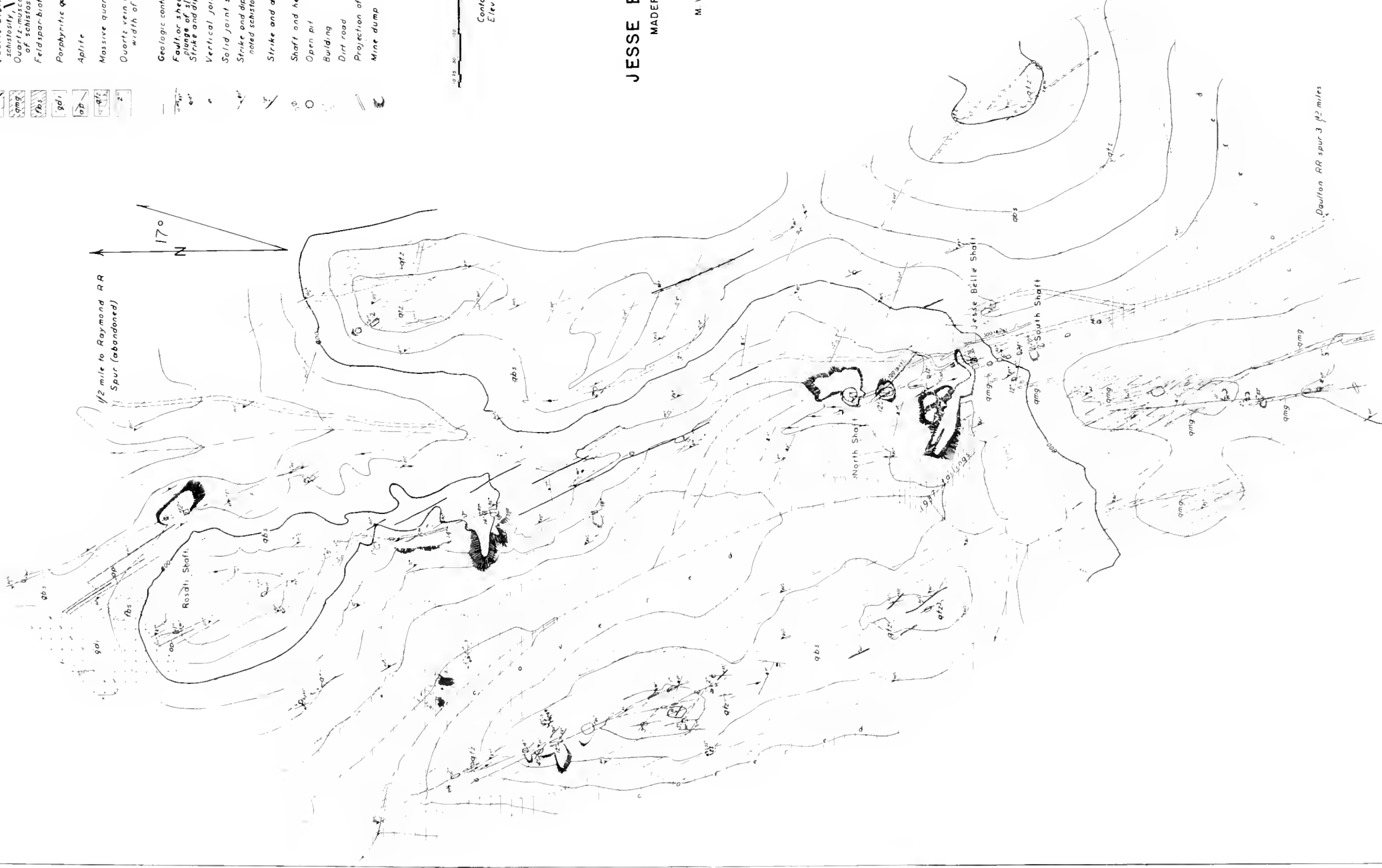
GEOLOGIC MAP
OF THE

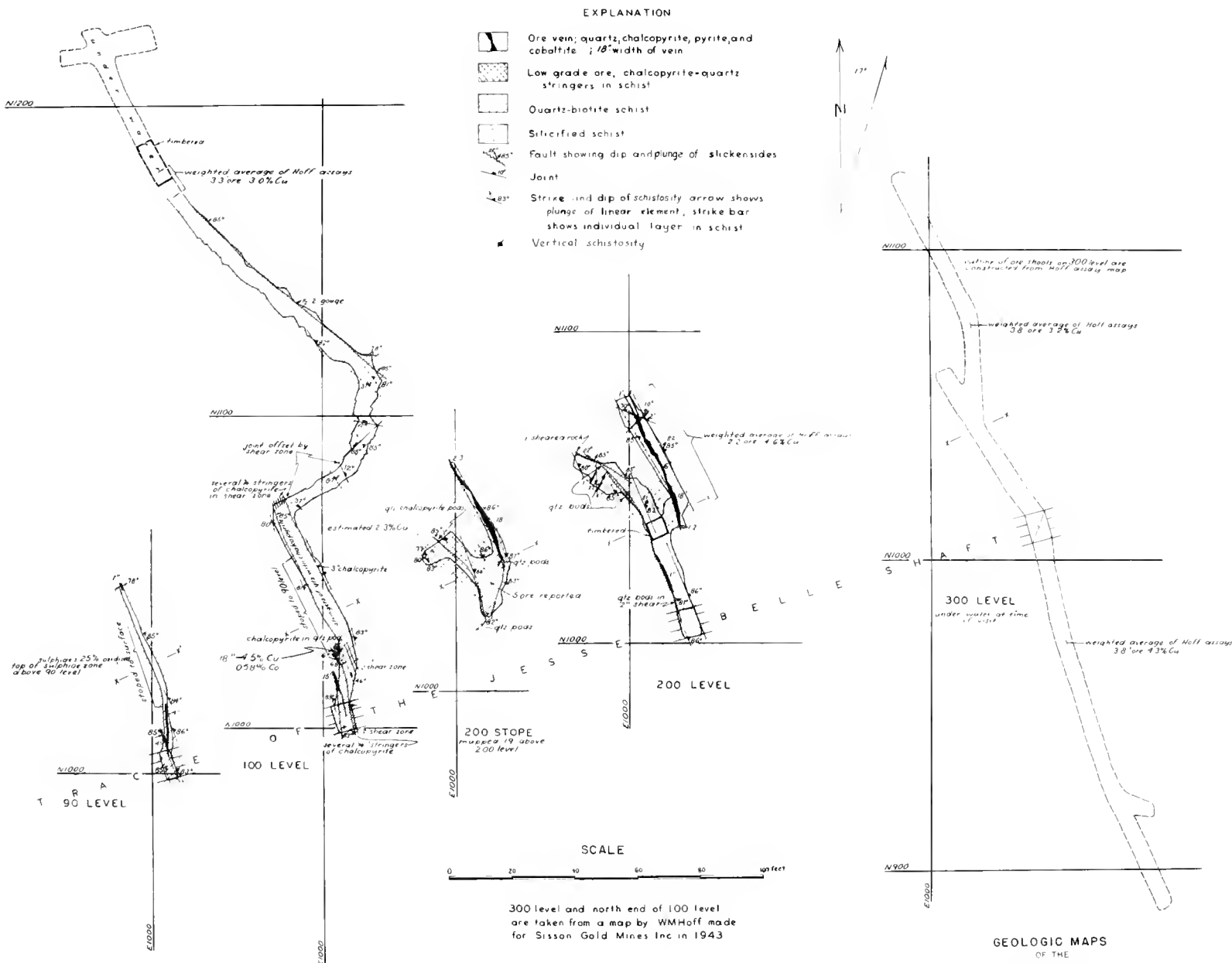
JESSE BELLE MINE AREA
MADERA COUNTY, CALIFORNIA

SURVEYED BY
M. W. COX AND D. G. WYANT

APRIL 1944

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GEOLOGIC MAPS
OF THE

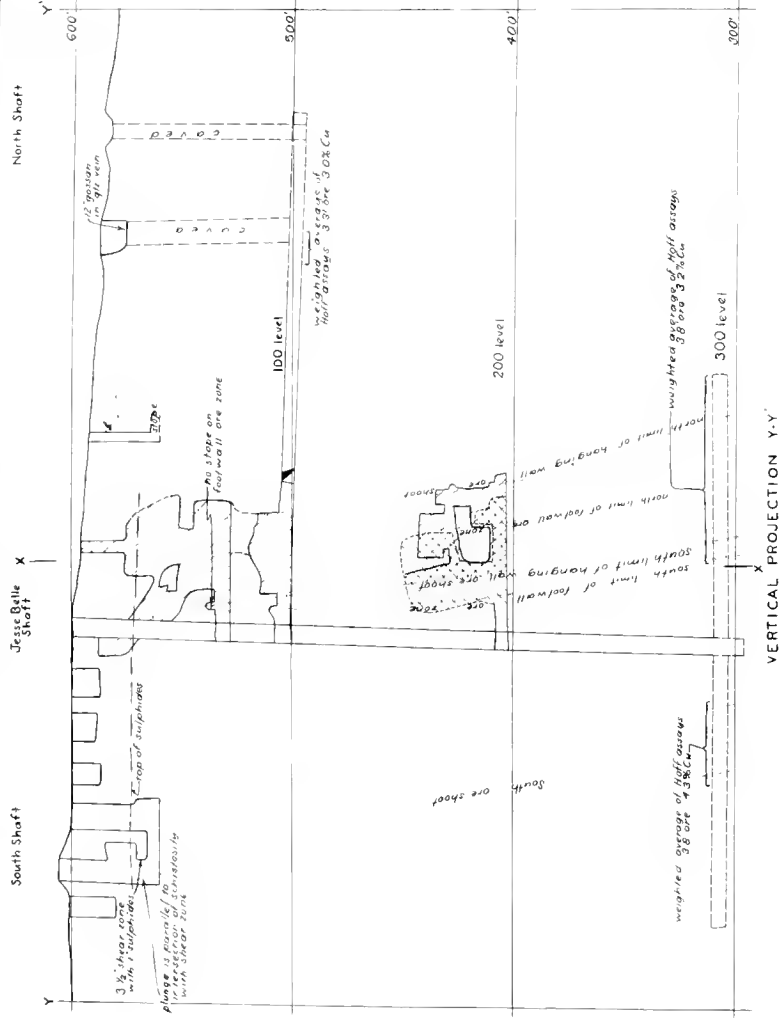
JESSE BELLE MINE
MADERA COUNTY, CALIFORNIA

SURVEYED BY

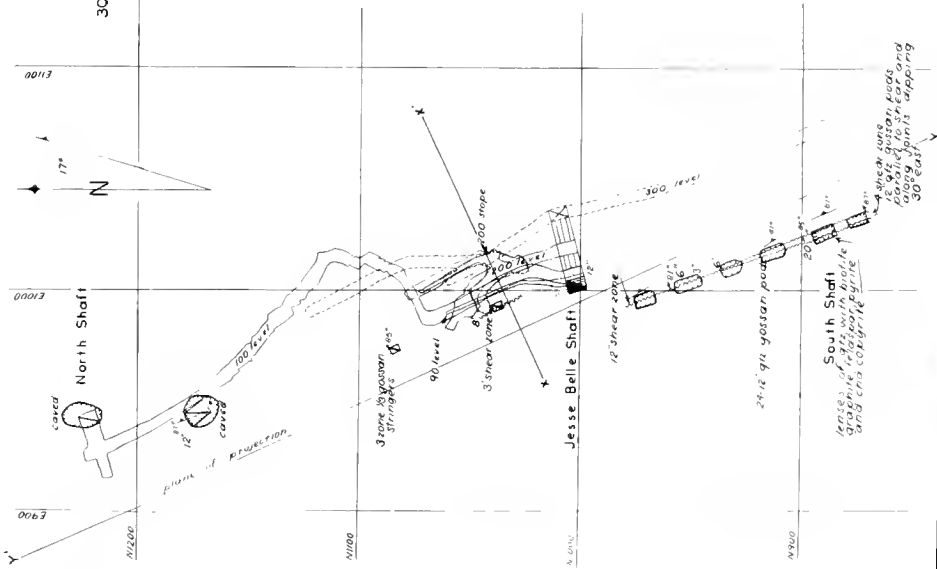
M. W. COX AND D. G. WYANT

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COMPOSITE MAP
300 level from map by WM. Hoff, 1943



EXPLANATION

- Surface pit
- ◻ Shaft collar
- 8 Vein, showing width of gossan
- ↘ Fault, showing dip
- ↘ Strike and dip of schistosity
- qtz Quartz

EXPLANATION
for sections

- Vein
- Fault
- Joint
- Footwall slope of main ore shoot
- Hanging wall slope of main ore shoot
- ◻ Cross cut to hanging wall
- Inaccessible workings
- qtz Quartz

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COMPOSITE MAP AND SECTIONS
OF THE

JESSE BELLE MINE
MADERA COUNTY, CALIFORNIA

SURVED BY

M W COX AND D G WYANT

SCALE
0 10 20 50 100 200 feet

APRIL-MAY 1944

